ARCHIVES OF OTOLOGY.

THE DISTRIBUTION OF BLOOD-VESSELS IN THE LABYRINTH OF THE EAR OF THE SHEEP AND THE CALF.

By GEORGE E. SHAMBAUGH, M.D.,

INSTRUCTOR IN ANATOMY OF THE EAR, NOSE, AND THROAT, UNIVERSITY OF CHICAGO.

[FROM THE HULL LABORATORY OF ANATOMY OF THE UNIVERSITY OF CHICAGO.]

(*With three figures on Plates XXI. and XXII., from German Edition (Zeitschr. f. Ohrenheilk.), Vol. XLVIII., issued Nov., 1904.*)

WHEN working out the circulation in the labyrinth of the ear of the domestic pig [1] I noted several striking variations in the course of the blood-vessels, from that described by Siebenmann and others for the human ear. The perfect injections I was able to obtain of the vessels in the labyrinth of the pig left no doubt of the correctness of the observations I had made. The question naturally presented itself whether these variations were not due to differences in the different species studied.[2] In order to determine this question I made several preparations of the blood-vessels

[1] *The Distribution of Blood-vessels in the Labyrinth of the Ear of Sus Scrofa Domesticus*, Decennial Publications, University of Chicago, University Press, Chicago, 1903.

[2] Siebenmann, in a review of the above work which appeared in the *Zeitschrift für Ohrenheilkunde*, Band xlvi., S. 143, suggests that the absence in my preparations of large veins from the semicircular canals which left the labyrinth along the aquæductus vestibuli was due to the destruction of these vessels, which he found lay in separate canals of the capsule, by the rapid corrosion and subsequent removal of the capsule in fragments with forceps. The answer to this criticism is: In the first place, in my preparations no break existed between the veins from the semicircular canals and the large veins of the vestibule which emptied into the vena canaliculi cochleæ just as I represented in the drawings; in the second place, I made a large number of preparations of young embryos in which the capsule was still cartilaginous and was not removed, and in these preparations the distribution of the veins of the semicircular canals was exactly as found in those where the capsule was removed.

in the labyrinth of the sheep and of the calf. Between these and the pig I was able to note variations as striking as those found between the pig and the description in the literature of the vessels in the human ear. I have since made a series of preparations of the blood-vessels in the labyrinth both of the sheep and the calf. The following is a description of the course of the blood-stream as found in the labyrinth of these two species:

SHEEP—FIG. 1.

Arteries.—The first branch of the labyrinthine artery is the anterior vestibular artery, a large trunk which follows the course of the ramus utriculo-ampullaris and supplies the macula acustica utriculi and the anterior crura of the superior and lateral semicircular canals. The second branch, lying parallel with and beneath the ramus ampullaris posterior, supplies the ampulla and the posterior crus of the posterior semicircular canal. The third branch, lying parallel with this, supplies the posterior crus of the lateral semicircular canal and the crus commune. In a few preparations a single vessel, the posterior vestibular artery, takes the place of these two vessels. The arteries for the most part cling to the concave surface of the osseous tube.

The branches that supply the cochlea are two in number, and are practically free from the anastomotic loops so prominent in the arteries at the base of the cochlea in the pig and the calf. Radiating on the under surface of the basal coil were seen a few arterial twigs; one of these left the labyrinth along the canaliculus cochleæ. The first arterial trunk to the cochlea supplies but the proximal half of the basal coil. The other arterial trunks supply the remainder of the coils of the cochleæ. The number of arteries radiating over the scala vestibuli are eighteen.

Veins.—All the venous blood from the labyrinth of the sheep's ear is collected into a single vessel, the vena canaliculi cochleæ. There were no veins in the meatus acusticus internus that received tributaries from the cochlea and no veins left along the aquæductus vestibuli.

All the veins from the vestibule and the semicircular ca-

nals are collected into a single large trunk, the vena vestibuli posterior, which empties into the vena canaliculi cochleæ. An anterior vestibular vein is wanting and the blood from the macula acustica utriculi and the anterior crura of the lateral and superior semicircular canals is collected by tributaries of the posterior vestibular vein (see Fig. 1). In the semicircular canals the venous trunks cling to the concave side of the membranous canal, just as I found in the pig. When the vein reaches the ampulla of the semicircular canal it arches over the dome of the convex surface of the ampulla (see Fig. 1) just as Siebenmann found in the human ear, with this difference, however, that the vein clings to the membranous ampulla and is not embedded in the endosteum of the ampulla, as Siebenmann described. This course is quite different from that taken in the ear of either the pig or the calf.

In the cochlea the following arrangement of venous trunks was observed: The vena spiralis posterior consists of but a single long vessel, which collects the blood from the entire extent of the basal coil. A separate branch for the distal end of the basal coil, as I found in the pig, and as Siebenmann described for the human ear, was absent. About the middle of the basal coil a large tributary empties into the posterior spiral vein. This trunk collects the blood from the upper coils and occupies the position of the anterior spiral vein, as described by Siebenmann—that is, it lies along the inner margin of the scala vestibuli.

The membrana vestibularis is richly supplied with blood-vessels. The arteries in many places could be traced as branches from the vessels arching over the scala vestibuli while the veins joined those of the lamina spiralis.

The spiral character of the vessels lying under the organ of Corti is more pronounced than the same vessels in the pig; these consist of two parallel vessels. Connecting vessels between the outer spiral vein and the veins of the ligamentum spirale were noted at irregular intervals, just as I found in the pig.

The aquæductus vestibuli is encased in a network of capillaries which drain into the posterior vestibular vein. A

small arterial twig from the posterior vestibular artery runs out along the aquæductus vestibuli, just as found in the pig.

CALF—FIGS. 2, 3.

Arteries.—The first branch of the labyrinthine artery in the calf is the anterior vestibular. It takes the same course and supplies the same parts as the anterior vestibular artery in the pig and the sheep. The trunk of the labyrinthine artery is often wound in a characteristic manner about the nervus cochleæ. Its direction is opposite to the coils of the cochlea (see Fig. 2), and in this respect it differs from the course of the labyrinthine artery in the pig. In the bottom of the meatus acusticus internus the labyrinthine artery breaks up into a dense network of anastomotic loops, which are much more complicated than the anastomotic loops found at the base of the cochlea in the pig. From this anastomotic network arise two arterial trunks which run back to supply the vestibule. One trunk supplies the posterior crus of the posterior semicircular canal, the other supplies the posterior crus of the lateral semicircular canal and the crus commune. In several preparations a single vessel, the posterior vestibular artery, takes the place of these two trunks. In the semicircular canals the arterial trunks are found lying in the endosteum of the concave surface of the osseous canal.

Spread over the under surface of the basal coil are a number of arteries radiating from the network of vessels in the bottom of the meatus acusticus internus. One of these arteries runs out along the canaliculus cochleæ. These arteries always lie external to the veins on the under surface of the basal coil. From the anastomotic network at the base of the cochlea arise the arteries which supply the coils of the cochlea. The number of arteries which arch over the scala vestibuli are from thirty-eight to forty.

Veins.—All the veins in the labyrinth of the calf drain into a single trunk, the vena canaliculi cochleæ, just as in the pig and the sheep, with the exception, however, that the vein of the crus commune often leaves the labyrinth along the aquæductus vestibuli. There are no veins in the mea-

tus acusticus internus which receive tributaries from the cochlea.

The venous blood from the vestibule is collected by two large trunks, the posterior and the anterior vestibular veins. The posterior vestibular vein collects the blood from the posterior crura of the posterior and the lateral semicircular canals and from the crus commune. It empties into the vena canaliculi cochleæ. The anterior vestibular vein collects the blood from the macula acustica utriculi and the anterior crura of the superior and the lateral semicircular canals, just as in the pig, and, arching over the anterior surface of the recessus sphæricus it empties into the vena canaliculi cochleæ. In a number of preparations the vein of the crus commune, instead of joining the posterior vestibular vein, curves around the anterior margin of the crus commune to leave the labyrinth along the aquæductus vestibuli. In some preparations, too, a small vein lying on the posterior surface of the crus commune left the labyrinth along the aquæductus vestibuli (see Fig. 3).

In the semicircular canals, the relation of the veins and capillaries is the same as that found in the pig and the sheep; they lie only in the walls of the membranous canal. At the proximal end of a semicircular canal the vein does not arch over the dome of the ampulla, as occurred in the sheep, but it takes a course straight across the base of the ampulla, to join the main venous trunk, just as I found in the pig.

In the cochlea, the vena spiralis posterior collects from the proximal two-thirds of the basal coil, as in the pig. A vein corresponding to the anterior vestibular vein, described by Siebenmann, is present for a large part of the coils of the cochlea.

The membrana vestibularis is well supplied in the calf with a network of vessels, which communicate on the one hand with those of the lamina spiralis, and on the other join the vessels which radiate over the scala vestibuli as well as those of the stria vascularis. In a well-injected embryo, 32*cm* long, the following interesting relations of the veins of the cochlea were noted: at a number of points throughout the

basal and middle coils the veins that collect the blood from the scala vestibuli did not arch back over the scala vestibuli, as shown in the illustrations for the labyrinth of the pig, but they ran back along the membrana vestibularis to the lamina spiralis, receiving tributaries from the stria vascularis as well.

The spiral character of the vessels under the organ of Corti is as well pronounced in the calf as in the sheep. These consist of two parallel vessels, with communication at intervals, as was found in the pig and the sheep, between the outer spiral vessel and those in the ligamentum spirale.

The aquæductus vestibuli is supplied by a small artery, a branch from the posterior vestibular, just as in the pig and the sheep.

An interesting anomaly in the arterial supply to the semicircular canals occurred in the labyrinth of a *22cm* embryo. In an embryo calf of this age the capsule of the labyrinth is still in the cartilaginous state, and in making the celloidin cast of the injected labyrinth the whole preparation, including the capsule, can be cleared in creosote. If such a preparation is studied through the stereoscopic microscope, it will be seen that the solid mass of the capsule wedged in between the arches of the three semicircular canals is penetrated by canals carrying arteries, and that these canals enter the capsule from its external surface, which is embedded in the spongy bone forming the upper ridge of the temporal bone, just external to the semicircular canals. One canal which entered the capsule from this surface carrying an artery ran straight forward, without anastomosing with any other vessel of the capsule, to the distal end of the crus commune. Here the artery divided into three divisions, one for each of the two semicircular canals, while the third branch ran down the anterior surface of the crus commune to its base. The vein of the crus commune in this preparation emptied into the posterior vestibular vein. Among twenty labyrinths from the calf that were studied, this relation of the arteries was found in but the one preparation, and probably exists only as an anomaly. It is of interest to note in this connection that Sappy described an artery

which entered the compact bone between the three semicircular canals from the upper border of the temporal bone, sending branches also to the membranous canals.

A comparative study of the blood-vessels in the labyrinth of the pig, the sheep, and the calf, leads to the following conclusions:

1. The scheme for the arterial supply to the vestibule and semicircular canals is a constant one, and consists, first, of a separate branch of the labyrinthine artery, the anterior vestibular artery, which supplies the macula acustica utriculi and the anterior crura of the superior and lateral semicircular canals; second, of a single trunk, the posterior vestibular artery, or of two trunks, which come from the labyrinthine artery at the base of the cochlea and supply the posterior crura of the posterior and lateral semicircular canals and the crus commune. A small artery, a branch of the posterior vestibular artery, leaves the vestibule along the aquæductus vestibuli.

2. Anastomotic loops between the several branches of the labyrinthine artery in the bottom of the meatus acusticus internus and at the base of the cochlea were most pronounced in the labyrinth of the calf, and least in that of the sheep.

3. The scheme for the arterial supply to the cochlea varies widely in its details for the three species. In the sheep and the calf, branches from the labyrinthine artery radiate over the under surface of the basal coil, and one of these small arteries left the labyrinth along the canaliculus cochleæ. In the labyrinth of the pig, the arteries under the basal coil were not found, and the vessels about the canaliculus cochleæ were embedded in the capsule, and were consequently destroyed by the corrosion, except in young embryos where the capsule was still cartilaginous and did not require removal in making the celloidin casts. Yet in the latter preparations I was unable to find an artery leaving along the canaliculus cochleæ.

4. Between the spiral vessels lying under the tunnel of Corti and the vessels in the ligamentum spirale communica-

tions were found in all three species. These consist of small, straight veins, which appear at irregular intervals.

5. The membrana vestibularis is supplied with a network of vessels in the sheep and the calf, but in the pig no vessels were found in this structure.

6. The venous blood from the cochlea in all three species empties into the vena canaliculi cochleæ. In none were any veins found in the meatus acusticus internus, which received tributaries from the cochlea.

7. In all three species, the venous blood from the vestibule and the semicircular canals drains into the vena canaliculi cochleæ, with this exception, that in the calf the vein from the crus commune often leaves the labyrinth along the aquæductus vestibuli.[1]

8. Two large veins, the anterior and the posterior vestibular veins, collect the blood from the vestibule and the semicircular canals in the pig and the calf, their distribution being the same as for the anterior and posterior vestibular arteries respectively. In the sheep, the anterior vestibular vein is wanting, its place being taken by the posterior vestibular vein which collects the blood from the whole of the vestibule and the semicircular canals.

9. The location of the vessels in the semicircular canals in all three species is the same. The arteries for the most part cling to the endosteum, lying along the concave side of the osseous canal; the veins and the capillaries are confined to the membranous canals. This differs from the descriptions and the illustrations that appear in the literature where the veins and capillaries are represented as lying in the endosteum of the osseous canals and in the ligaments of Rüdinger. In all of my preparations, the large size of the membranous canals as compared with the osseous canals was such as to give the impression on first studying them that the vessels which encased the membranous canals were in the endosteum of the osseous canals. On closer study of the preparations with the stereoscopic microscope, and by mak-

[1] Siebenmann found in the human ear that the veins from all the semicircular canals united into a common trunk, which left the labyrinth along the aquæductus vestibuli.

ing cross-sections of the semicircular canals, I was able to demonstrate definitely the fact that only the arteries lay in the endosteum, while the veins and capillaries were distributed to the membranous canals, as shown in Plate xii., Figs. 1 and 2, of the article on the blood-vessels in the labyrinth of the pig.

EXPLANATION OF PLATES.

FIG. 1.—*Vcc*, vena canaliculi cochleæ; *Rap*, ramus ampullaris posterior; *Vvp*, vena vestibuli posterior; *Vsp*, vena spiralis posterior; *Al*, arteria labyrinthi; *Rua*, ramus utriculo-ampullaris; *Ava*, arteria vestibuli anterior; *Nc*, nervus cochleæ.

FIG. 2.—*Vcc*, vena canaliculi cochleæ; *Vvp*, vena vestibuli posterior; *Av*, aquæductus vestibuli; *Nc*, nervus cochleæ; *Al*, arteria labyrinthi; *Rap*, ramus ampullaris posterior; *Vva*, vena vestibuli anterior; *Rua*, ramus utriculo-ampullaris; *Ava*, arteria vestibuli anterior.

FIG. 3.—*Vcc*, vena canaliculi cochleæ; *Vvp*, vena vestibuli posterior; *Av*, aquæductus vestibuli; *Nc*, nervus cochleæ; *Rap*, ramus ampullaris posterior; *Vva*, vena vestibuli anterior; *Rua*, ramus utriculo-ampullaris.

THE ANATOMY OF THE CHILD'S EAR, EMPHASIZING POINTS OF PRACTICAL IMPORTANCE.[1]

By Dr. W. SOHIER BRYANT.

THERE are many important points in the anatomy of the child's ear which are well brought out by comparison with the adult.

The diagrams you see were furnished through the courtesy of Dr. B. Alexander Randall, of Philadelphia. They show the general appearance of the infantile and adult temporal bones. After exhibiting the lantern-slides and skulls loaned by Dr. Herman Knapp, anatomical specimens I have prepared through the kindness of Professor Huntington will be handed round.

At birth the temporal bone is loosely connected with the other cranial bones, and is all made up of soft and spongy bone, mostly diploic, except the capsule of the labyrinth, which is dense bone. The bone gradually forms cortical layers, and at the close of the first year is quite solid, though still thin. At first the temporal bone is very vascular and is traversed by many foramina containing vessels which allow very free circulation of the blood between all the surfaces of the bone. The chief of these is the petro-squamosal foramen. The temporal bone can readily be divided into its petro-mastoid and squamo-tympanic parts, which are separated by wide sutures. The annulus tympanicus is firmly attached by its apices to the outer plate of the squa-

[1] Read at meeting of the New York Academy of Medicine under the auspices of Section on Otology, December, 1904.

mous bone. But the petro-mastoid portion is still separated from the squamous by a cartilaginous plate, and the petro-tympanic suture is wide open; but before the end of the first year all the parts are united.

In the new-born infant the mastoid antrum is about 8*m* long from the tip of the short process of the incus. The adult is about 11*m* long, measured in the same way. In the infant the walls are of spongy bone, and the outer one made by the posterior process of the outer plate of the squama is softer and thinner than the tegmen, which explains the readiness with which post-aural abscesses occur in infancy. The mastoid process is not yet formed, but its future site is indicated by a flat tubercle, and its development begins about the second year, after which it grows chiefly from an increase of diploë till the time of puberty, when it grows rapidly, and the air cells are completely developed. At birth the upper part of the antrum may be encroached upon by trabeculæ enclosing cells. Small cells may appear in the base of the process as early as the third year. The mastoid process is completely developed shortly after puberty. The groove for the sigmoid sinus becomes noticeable about the end of the first year, and its development is completed at puberty in company with the cells of the mastoid process. At birth the sigmoid sinus is always placed well behind the tympanum and never approaches the meatus, and the bone between it and the mastoid antrum is comparatively thick.

At birth the lower and outer walls of the facial canal are wanting where it crosses the tympanum above the oval window. The osseous Eustachian tube is also wanting. The tympanic cavity proper is about as extensive as in the adult, measuring 14*m* parallel to the malleus handle. Sieve-like bone separates the floor of the tympanum from the carotid canal, and from the jugular fossa which is located directly below and not behind the tympanum. The oblique position of the meatus and this thin plate of bone allow a puncture of the jugular bulb during paracentesis. The osseous labyrinth, the ossicles, and the sulcus tympanicus are fully developed, and, together with the facial canal, are in their permanent relative positions. The tympanum proper changes

very little after birth, but its accessory cavities, the mastoid system and Eustachian tube, undergo development. The tympanic muscles also grow much larger.

The osseous external auditory meatus does not exist at birth, and the suprameatal spine is not yet developed. During the second year, the tubercles of the annulus tympanicus have enlarged sufficiently to meet and enclose the foramen of Huschke, which gradually closes and is usually obliterated after the fifth year.

Development of the whole temporal bone is complete soon after puberty.

The external auditory meatus at birth measures about 13*m* on the upper wall and 19*m* on the lower; the adult, about 29 and 35*m* respectively. It is not closed by agglutination of its walls as in the young of the lower mammals, but there is a simple coaptation of the inferior and superior walls and the membrana tympani with the inferior wall. The irregularities are filled with desquamated epithelium, and the lumen or air space of the meatus does not exist. In a few days after birth the meatus slowly opens, forming an hour-glass-shaped canal flattened above and below with a constriction corresponding to the isthmus of the canal of the adult. This hour-glass, which is large at the inner end to fit the size of the annulus, retains foreign bodies with more tenacity than the adult meatus. The axis of the external meatus is directed slightly upward, which necessitates downward traction on the auricle to allow inspection of the membrana, and causes the illusion that the membrane lies horizontally. At birth half the meatus is membranous and the other half cartilaginous.

The Eustachian tube is narrower and much shorter in the infant. It measures about 20*m* and in the adult about 40*m* from the anterior border of the sulcus tympanicus. Its lumen at the isthmus is about half that of the adult, measuring about 2*m* against 4*m* in the adult. Unlike the adult, it lies in a horizontal plane. But its angle with the median plane is about 45° forwards and outwards as in the adult. It assumes the adult position at puberty. The relative position of the pharyngeal orifice in relation to the posterior

pharyngeal wall and velum palati is farther forward and slightly lower down. The fossa of Rosenmüller does not form a deep depression till later in life.

The tympanic air cavity does not exist at birth, the osseous cavity being filled with myxomatous tissue and cellular detritus. It is not formed till several days later after the air enters through the Eustachian tube. Still later the air takes the place of the myxomatous contents of the mastoid antrum. The mucosa lining the tympanic cavity and antrum has a very thick submucous layer, and a very uneven surface in the tympanum proper. The thickness of the submucous lining and the reduplication of the membrane reduce the size of the tympanic cavity and mastoid antrum considerably. In general the tympanic cavity and mastoid antrum of the infant contain much more mucous membrane and bony trabeculæ than in later life. The contents of the tympanum proper are fully developed at birth. The change age brings is a reduction in the mucous membrane and bony trabeculæ, making the walls smoother. The drum membrane is the same size as in the adult.

It is worthy of note that the lymphatics of the infant show a more important difference in comparison with those of the adult than any of the other structures. It is peculiarly significant that the infantile lymphatics are nine times more permeable than in the adult. The length of the lymphatics from the ear to the mediastinum in the infant is about one-ninth of that in the adult—2.5*cm* to 16*cm*. Dr. Churchill Carmalt has shown in some unpublished investigations that the calibre of the lymphatics is as large in the infant as in the adult. These dimensions allow nine times readier transmission of bacteria to the mediastinum than in the adult.

I take pleasure in introducing Dr. Carmalt, who has some instructive specimens.

THE PATHOLOGY OF THE INFANT'S EAR UNDERLYING AURAL AND GENERAL DISEASE.[1]

By JOSEPH A. KENEFICK, M.D.,

ASSISTANT AURAL SURGEON NEW YORK EYE AND EAR INFIRMARY; OTOLOGIST TO NEW YORK FOUNDLING HOSPITAL.

THE theory of pathologic processes in aural disease has assumed an entirely new phase through the bacteriologic investigations of recent years.

In a certain cyclopædia of children's diseases, published little more than ten years ago, under the heading of "Ear Diseases" the word micro-organism does not once appear, while under the head of "Necrosis" the information is afforded that "we now know that brain abscess is the cause and not the result of aural necrosis."

From the anatomical facts presented, you must have been struck with the apparent extraordinary vulnerability of the infant's temporal bone. Indeed considering the vascular structure, its elaborate communicating network of blood- and lymph-vessels and the numerous dehiscences, foramina, and fissures through which they pass, the wonder is that cerebral involvement and general pyæmia do not more often occur.

Under ordinary conditions, pyogenic micro-organisms from food and inspired air may invade the cavities of the temporal bone without special disturbance. But in the presence of lowered vitality from disease or active inflammatory irri-

[1] Read at meeting of the New York Academy of Medicine under the auspices of the Section on Otology, December, 1904.

tation, conditions favorable for the development of these pyogenic organisms and the elaboration of their toxins are brought about.

Thus in young children, according to Politzer, middle-ear inflammatory exudations are found in broncho-pneumonia, bronchitis, intestinal catarrhs, and the acute and chronic infectious diseases.

Inflammation of hypertrophied faucial tonsils and of the lymphoid tissue in the vault of the pharynx is a common cause of extension by way of the Eustachian tube to the tympanum. This process is characterized by swelling of the lining with closure of the tube, acute vascular engorgement of the lining of the tympanum, cell exudation, and eventually active leucocyte migration. Meantime the process has similarly involved the tympanic membrane.

As this process in the tympanic membrane increases in severity, the outer and inner epithelial layers become exfoliated, and the lamina propria or connective-tissue layer, weakened by exudation and purulent infiltration, finally yields to the tension and perforation occurs.

This tension may be so great as to cause convulsions, or, by reason of its incomplete osseous protection in the tympanic cavity, paralysis of the facial nerve.

This is the so-called fulminating type seen in vigorous infants.

As in the young infant the tympanum and rudimentary mastoid antrum are already filled with myxomatous embryonal tissue, such a process described above may be a more elaborate one than is ordinarily imagined.

When no sufficient outlet has not been provided by spontaneous puncture or paracentesis, the purulent secretion in the tympanum must seek other methods of escape.

Owing to the influence of gravitation, to the fact that the young periosteum at this time is readily dissected up from its underlying bone, and to the numerous unclosed fissures, sutures, and foramina, the direction of least resistance is, fortunately, outward in the great majority of cases, much depending, of course, on the severity of the process and the resistance of the individual.

This escape may be had upward and outward through the Rivinian fissure in the antral roof and backward between bone and periosteum, to form an abscess immediately behind and above the ear.

Pus may escape through the cartilaginous fissures in the posterior wall of the external canal, and involve posterior auricular glands in the formation of abscess immediately over the mastoid antrum, displacing the auricle outward and forward in characteristic fashion.

Simultaneously with this process the mastoid antrum has become involved, although on opening through the postaural abscess no perforation of the cortex and no evidence of bone disease are found.

Again the purulent exudate may escape through the imperfectly closed roofs of the antrum and tympanum, or along communicating lymph- and blood-vessels directly to the middle cranial fossa, setting up meningitis, epidural or subdural abscess, or, involving the brain tissue itself, set up abscess or abscesses in the neighboring temporo-sphenoidal lobe. Such abscesses may exist without any apparent connecting sinus, and even with apparently healthy brain tissue separating it from the tympanic and antral roof.

Further, infection may occur by extension through the imperfect floor of the tympanum, or along the walls of communicating blood- and lymph-vessels, setting up thrombosis in the jugular sinus, with the bulb of which the tympanum floor is in immediate communication.

Again, according to Macewen, extension may occur to the meninges directly through the internal labyrinth wall and its structures, which at this time are insufficiently protected by ossification.

Where the mastoid antrum is present, but no cells yet developed, Macewen says that thrombotic involvement of the sigmoid sinus is rare, on account of the outlet provided by the open sutures and because the sinus is yet a flat affair and its bony gutter not yet hollowed out.

In older children, however, there may be extension from the antrum into the neighboring young cells, resulting eventually, through carious softening or through the medium of

intercommunicating structures, in thrombosis of the underlying sinus.

In similar way, the infective process may extend by way of the posterior surface of the pyramid to the cerebellum, setting up meningitis and abscess there.

One must bear constantly in mind the various possibilities in the course of purulent otitis. So subtle is the method of extension of infective micro-organisms, especially along the sheaths of nerves and the walls of lymph- and blood-vessels, that one might say there is scarcely a single intracranial infection of otitic origin which may not occur without rupture of the drum membrane and without apparent lesion of the internal protecting structures of the skull. In a recent communication on this subject, Eagleton refers to two fatal cases of brain abscess in young infants in which ear disease was not even suspected.

In the consideration of general disease with which severe otitis is frequently associated, scarlet-fever easily leads.

Holt affirms that as a cause of permanent deafness and deafmutism, no disease of childhood compares in importance with scarlet-fever. He quotes the statistics of May, who, in 5613 cases of deafmutism, found that 572 were caused by scarlatinal otitis.

In this disease the progress of the otitis may be characterized by the most severe and rapid inflammatory processes, ending not only in the destruction of the contents of the tympanic cavity, but in involvement of the internal ear and cerebral structures directly through the labyrinthine wall, and even in complete necrosis and exfoliation of the labyrinthine capsule itself—the panotitis of Politzer.

Cerebro-spinal meningitis is considered next important in the relation. Whereas scarlet-fever destroys the internal ear from without, this disease invades from within the brain, the specific infecting micro-organism passing from the neighboring meninges and invading the aqueduct of the cochlea and the vestibule, thus affecting both hearing and equilibrial branches of the auditory nerve as well as its trunk and nuclei. Hence the staggering gait and hopeless deafness of those who recover.

The other diseases—measles, diphtheria, influenza, and some more important ones—I am obliged through lack of time to pass over.

In connection with gastro-intestinal disease, in which the so-called latent type of otitis is found in contradistinction to the fulminating type, already described, the studies by Dr. Preysing of Leipsic of the temporal bones of 100 infants two years old and under are of interest.

Of this number, 44 died of gastro-intestinal disease, and of the 200 tympanic cavities examined an exudate was found in 153—33 of which proved to be sterile.

Of these 153 temporals, tympanic membrane perforation was found only 9 times, several of which were artificially produced.

This form of otitis has been described by Heermann as otitis concomitans of infancy, and he assigns its cause to the general weakness of disturbed nutrition.

If, as Politzer insists, both of these types may have the same complications, the infant may be seriously threatened by his latent otitis.

In the respiratory tract the most frequently associated disease is broncho-pneumonia.

If, as according to statistics, one-third of all deaths reported occur in the first two years of infancy when so many die of broncho-pneumonia, any relation between this disease and otitis must challenge our attention. The association of cerebral complications with broncho-pneumonia appears in most statistic tables. In a series quoted by Holt of 100 autopsies on infants under three years, there appear two cases of meningitis and one of cerebral abscess.

In 67 of these 100 the pneumococcus in pure culture was found present.

To return now to the remarkable study of Preysing's 100 autopsies, we find the astonishing statement that out of 121 infected tympanic cavities 112, or 92⅓ per cent., contained the pneumococcus in mixed infection, while in 96 this germ appeared in pure culture.

It is interesting to note that 60 per cent. of all cases of lepto-meningitis, according to Stengel, are caused by the

pneumococcus, and lumbar puncture in otitic cases is giving pure cultures of the germ with increasing frequency.

Preysing, in his conclusions, does not accept the theory of the extension of disease by way of the tube, but rather that a toxæmia occurs directly from the imprisoned exudate. Nor does he claim that otitis is a primary disease. He considers the "interdepending causes so multiform that he must limit himself to that portion based upon his bacteriologic findings." He finds in his studies that "otitis owes its origin to the same cause as that of most pneumonia cases," and considers the two diseases closely related to a third—*infection of the pharynx and naso-pharynx by germ-laden air.*

In conclusion, then, it would seem, cold being given as a frequent cause of apparently primary broncho-pneumonia, that fresh air may be at once the life and death of the infant, and that the weakling who, in addition to being fed on sterilized food, is carried through the first two years of his life in an atmosphere of sterilized air, would be likely to evade some of his most subtle and formidable enemies, the pneumococci, and get a firmer grip on existence than that which under the present order of things he is able to obtain.

OTITIS MEDIA IN CHILDREN.[1]

By A. JACOBI, M.D., LL.D.

DR. G. HEERMANN published in 1898 a small book on "Otitis Media in Infancy (Otitis Concomitans)." For a part of the critical history of that affection I refer you to him. When I looked over the shelves of our library which are filled with books and pamphlets written on the ear, and glanced over the literature contained in the subject catalogue of the Surgeon-General's Library, I was glad to remember that I must not take more than fifteen minutes of your time. This, then, is not an historical paper.

Otitis media is of frequent occurrence in the very young. It may combine with the retrograde involution of the embryonal myxomatous tissue,which may disappear soon after birth but persists often in the antrum and tympanic cavity and undergoes purulent softening. Otitis media may exhibit mild and grave symptoms, like every form of inflammation in other organs. For instance, the localized mild croupous or lobular pneumonia, and one that migrates or terminates in induration or in atelectasis or abscess, is still called a pneumonia and nothing else. Otitis may be either a mere surface affection of the mucous membrane, or one complicated or not with thrombosis, or suppuration, or caries, or facial paralysis, or meningeal or other complications, and is still denominated an otitis. It may be either primary or secondary to a naso-pharyngeal disease, or cause or be caused by, or appear contemporaneously with, pneumonia, meningitis, or enteritis;—it is still an otitis. That is why I decline to sub-

[1] Read at meeting of the New York Academy of Medicine under auspices of Section on Otology, December, 1904.

divide otitis as Heermann has done—into a bona-fide otitis and a concomitant otitis, the latter name being given to those forms which are observed in atrophic or emaciated infants, whose general illness however shows no actual differences in the symptoms or even in the course of their local disease, or in their bacteriology. What we have to remember is the fact that the same symptoms and extent of local changes do not belong to all cases equally, and that the same therapy is not adapted to every case.

Purulent otitis is frequently found in autopsies. Preysing found in those made on 100 infants that died of a variety of diseases, 81 affected with otitis media. Only 8 were unilateral, so that there were 154 diseased ears among 100 dead infants. Nor are older children exempt. Geppert found a latent otitis media in 75 % of all the inmates of the children's hospitals he examined. These are the same results which are obtained by previous and succeeding observers of the same disease when occurring at different ages. School-children have been examined in that direction a great many times, but I give only two instances which, so far as I know, have not been copied in our journals. Dillner found among 38 children that had to be excluded from their schools on account of incompetence 9 still suffering from inflammatory ear diseases; Kalischer, among 255 children excluded because they made no progress and hindered their classmates, 80 with previous or still persistent middle-ear inflammations.

Pyogenous microbes enter the middle ear mainly from the naso-pharynx, which according to R. O. Neumann [1] contains even in its normal condition a large number of microbes, mainly micrococcus pyogenes albus in from 86 to 90 % and the bacillus pseudo-diphtheriæ in 98 % of all cases. In nasal catarrh there is a relative increase of the bacillus pneumoniæ of Fraenkel and Friedlander, of streptococcus pyogenes, and of the bacillus of diphtheria. These latter may cause nasal catarrh, while the bacillus pseudo-diphtheriæ is a saprophyte only. Thus my frequent statement that

[1] *Zeitschr. f. Hyg. und Inf. Krkh.*, 1902, vol. 40.

many cases of nasal catarrh during an epidemic of diphtheria were diphtheritic—first based on clinical observations published in the *American Medical Times*, of August, 1860,—is confirmed by the most recent bacteriologic research.[1]

Microbes get into the middle ear in the contiguity of the surface of the mucous membrane progressively, not necessarily in every case of diphtheria, scarlatina, or other eruptive disease, but still frequently; or they are thrown in during coughing, vomiting, or sneezing. That is mainly so when the nares are obstructed by catarrhal swelling, or by the presence of mucus or of a membrane, or by a high degree of congenital deviation. Nurslings are in danger during suckling and deglutition—the more so the lower their vitality and the more fragile their epithelia, the feebler their circulation and the greater their emaciation. It is in these conditions that microbes, mainly cocci, which are ubiquitous in the accessible cavities, will enter the tube with great facility and meet those which are previously inhabiting it, and which become very effective by the circumstance that under the influence of ill nutrition, atrophy, and colds the vibrating epithelia become paralyzed. This latter condition is easily produced, on account of the normally slow air current in the Eustachian tubes and in the middle ear. A very direct cause of otitis media is found in the presence of naso-pharyngeal diphtheria or straightforward "nasal" diphtheria, which in its mild or grave form is by no means so uncommon as a very modern author seems to believe, who thinks it worth while to publish, in three long articles, three new cases of primary nasal diphtheria. It is true that in this paper there is a display of such erudition as is apt to be exhibited in quotations. The author's literature goes back to antiquity, and that antiquity to 1900, aye to 1890. I admit that is uncommon research in our over-productive journal literature. But there is still more ancient literature on the subject.[2] In nasal and naso-pharyngeal diphtheria, otitis media is quite frequent, perhaps, however, not quite

[1] *Therapeutics of Infancy and Childhood*, 3d edition, p. 407.

[2] The contributions to diphtheria, published in the *Journal of Obstetrics*, February, 1875; the article on "Diphtheria," in the second volume of Gerhardt's *Handbook*, 1877; and the *Treatise on Diphtheria*, published by Wm. Wood &

so frequent as we might expect if we overlooked the cases in which the membrane is solid and firmly closes the orifice of the Eustachian tube. It is mostly observed in those cases of nasal diphtheria in which the membranous deposits are very light and flocculent and the secretion copious and acrid. It is principally this class of cases in which the nasal injections or irrigations introduced by me more than forty years ago prove life-saving, and, as to ears, preventive.

In diphtheria of the throat, a slight swelling of the mucous membrane or, as I have said, a moderate diphtheritic deposit may close the Eustachian tubes, and hard-hearing may be the result. In this class of cases the patient complains not infrequently of intense pain behind the angle of the jaw and in the ear, and in some cases the diphtheritic membrane is continued into the tubes, and gives rise to otitis interna and media, which finally terminates in perforation of the drum membrane, and occasionally in caries of the bones. Wreder[1] collected 18 cases of diphtheria of the middle ear in scarlatina, complicated with the same affection of the fauces and nares. One child with diphtheria of the mouth and pharynx had also diphtheria of the inner ear. Kuepper saw diphtheria of the middle ear and Eustachian tube, and Wendt once in the tubes, and, amongst 84 cases of variola, twice in the middle ear, together with the same affection in the naso-pharyngeal cavity.[2]

A frequent cause of otitis media is scarlet-fever, with its coccic or bacillary throat affection. In mild or severe cases there may be perforation of the drum membrane, necrosis of the drum membrane and of bones, progress of that process to the antrum and the cells of the mastoid processes and to the sinuses and meninges, with the results of pyæmia, brain abscess, or septicæmia. In some of these cases of scarlatinal otitis media there may be, without many apparent local symptoms, fever, delirium, diarrhœa, or bronchitis. Many such cases while yielding no pain from pressure on the mas-

Co., 1880; even the several editions of the *Therapeutics of Infancy and Childhood*—all of which references are in our own library—contain what would have facilitated modern re-discoveries.

[1] *Monatschr. f. Ohrenh.*, x., 1868.

[2] Quoted from my *Treatise on Diphtheria*, 1880.

toid process exhibit fever, not always with a steep pyæmic curve, and merely a swelled lymph node on the mastoid process. In that condition it is safer to take these seemingly mild cases seriously, and to operate. Pus may be, and frequently is, inside the bone.

In measles, influenza, typhoid fever, and variola otitis media is not quite so frequent as in scarlatina. Otherwise, all the varieties of nasal, pharyngeal, and naso-pharyngeal catarrh, also adenoid vegetations and hypertrophied tonsils, are known to be frequent causes or accompaniments of ear disease. The influence of hypertrophied tonsils is perhaps exaggerated in the estimation of many of us in this, that when *uncomplicated* they do not easily cause otitis; but it is true that there are but a few cases in which they stand alone, by themselves. They are almost always complicated with catarrh in the neighborhood, and with accumulations of mucus which cannot be readily dislodged and undergo disintegration. To that fact Yeardsley drew attention seventy years ago. Altogether, to my certain conviction, the rôle of the tonsils in other conditions is also over-estimated. I may be permitted to mention here, as I have done many times before, that their influence in admitting cocci, bacilli, and toxins as a cause of scarlatina, diphtheria, tuberculosis, and rheumatism is inferior to the absorbing power of the numerous surrounding lymph bodies, for these latter are in a much more intimate connection with the lymph circulation than the tonsils which are surrounded by a firm capsule. Some of the causes which carry noxious material into the tube I have mentioned. I emphasize again the influence of coughing—mainly in whooping-cough, but also in pneumonia—of vomiting, and of sneezing, also possibly of medicinal and other injections into the nares; of a transfer by the fingers of enteritic material, particularly when the Eustachian tube is made more accessible by a bifid uvula, or when the soft or hard palate is fissured, or in the presence of impeding adenoids; for then the levatores palati muscles have no support and the muscles of the tubes are insufficient and atrophied.

Primary tuberculosis of the middle ear is rare. It may be

the result of bacilli entering from outside through the perforated drum membrane, or through the Eustachian tube during coughing or sneezing. Secondarily, it depends on invasion through the Eustachian tube in cases of pharyngeal, laryngeal, or pulmonary tuberculosis, or through the circulation. This happens mostly during the glandular and bone tuberculosis of the young, and in miliary tuberculosis. Altogether the reports differ in regard to the frequency of tuberculous otitis media. Bezold found only 127 cases amongst 17,087 ear patients. Amongst the chronic abscesses of the middle ear 4.4 % are tuberculous. Few of them occur in infants and children, that is only 5.5 % of the whole number, while the remaining 94.5 % belong to advanced age (Habermann). Abscesses of the internal ear though they be in tuberculous children need not result from or contain tubercle bacilli, though according to one statistical report 9 % of all the abscesses were said to have been found in tuberculous children, and a few of them had miliary tuberculosis. The otitis media depended in almost every case on pneumococci.

In cerebro-spinal meningitis the ear is often affected, more it appears in some epidemics like that of this year (1894) than in others. I never saw a case of deafness and consecutive deafmutism originating in cerebro-spinal meningitis that recovered. Whether preventive measures may reduce this untoward experience remains to be seen. For nasal affections are frequent. In almost every case of mine, observed this year, there was catarrh; in all that were examined for it, diplococci meningo-intercellulares were found in large numbers. This nasal affection may and does lead to otitis media. The labyrinth deafness occurring during the height of the disease has thus far proved very unfavorable.

Inflammations of the inner ear are rare, only two in Preysing's 197 cases. Perhaps the majority depend on cerebro-spinal meningitis. In one of these cases the transmission was not even direct, for the first result of the otitis media was a purulent meningitis, in the course of which the inner ear of the opposite side became diseased. Ménière's symptoms, namely, disturbance of the equilibrium, nausea, and

vomiting, are not often observed. They will always get worse after quinine or salicylic acid.

The contents of the middle ear may be visible through the drum membrane or not; the latter may bulge or not. That is why in very many cases otitis media may not be accessible to a diagnosis, and perforation of the drum membrane is not so common as might be expected. It happened in only nine of Preysing's 154 diseased ears. This infrequency of perforation is believed to be due to several reasons.

1. The greater resistance of the drum membrane in the young, the external cutis layer being often thicker than in the adult, the median connective-tissue membrane very solid, and the inner mucous membrane with its pavement epithelium at least as normal as in advanced age.

2. In the young the Eustachian tube is short but wider, both at the isthmus and at the tympanic orifice, and the direction of the canal almost horizontal. In the fœtus the opening of the tube is below the level of the hard palate; at birth it reaches that level; in a child four years old it is about 3*mm* above it.[1] That is why Preysing denies the easy exit of the pus into the pharynx. He claims, what is true, that the pus is mostly thick, and that pus would rather, while the baby is on its back, run into the mastoid antrum than through the tube. But the recumbent position is not always kept up, so long as the baby is not yet on the autopsy table. Bedside and nursery observers will appreciate this, and pathologists might.

It should be remembered that most of the figures quoted are taken from poorly developed, emaciated, even atrophic hospital cases. Now atrophy affects the mucous membrane of the Eustachian tube as well as the rest of the body and adds to the width of the tube, which is thus wider in this class of patients than in the healthy and well-nourished. In this latter, perforation of the drum membrane is not so very rare, though indeed many a case of otitis media in this very class of patients, after fever, sensitiveness on pressure, and meningeal symptoms have been distinctly noticed, will

[1] T. Mark Hovell, 2d edition, 1901.

run a mild course without perforation. Whatever pus does not find its way into the pharynx—no perforation having occurred—is, or may be, absorbed, while the inner mucous membrane, including that which covers the drum membrane, will become thickened and give rise to hard-hearing or even deafmutism. Still there is another possibility, and indeed one of frequent occurrence. The copious net of lymph vessels in the young is always very active, in the emaciate and atrophic very greedy, and the absence (caused by the disease) of the pavement epithelium of the drum membrane and of the cylindrical and vibrating of the interior permits more rapid absorption. This condition is a sufficient explanation of the readiness with which absorption may take place from the interior of the ear into the lymph and blood circulation, and lead to deposits in distant organs, to mild or serious sepsis, to persistent exhibitions of temperature with no tangible cause, to death, or to slow recovery. Moreover, Preysing found on the inflamed surface, as the result of copious leucocyte migration, granulation globules with minute blood-vessels, without epithelia, resembling in shape small tubercles, and surrounded by slight hemorrhages and a narrow ring of beginning organization. These little granulomata, with their small blood-vessels, may also favor absorption.

The pneumococcus which is found in otitis is rather ubiquitous. As we find it in pneumonia, meningitis, pericarditis, peritonitis, and so on, we need not be surprised at meeting it in connection with the otitis of the young, with a pneumonia, or with an enteritis, and their results. Pædatrophy and otitis have been known to combine, more than half a century. I was taught their clinical cotemporaneousness when a younger student of medicine than I am to-day, fifty-five years ago. Which of these complications,—otitis, pneumonia, enteritis, or meningitis,—is the primary one is difficult to say in most cases. To my mind, none of them is, in many a case, the primary cause of the general infection. Pneumococcus, being present on every healthy mucous membrane, will enter the circulation from any point, particularly from the nose, on which, by accident or disease, the

epithelial cover is removed or on which it is disintegrated. Thus a meningitis may be the first symptom of a general pneumococcus invasion. It may be followed by other localizations or by general sepsis. Persistent diarrhœa, often fatal, is frequently observed in such cases. Homen and Laitinen, quoted by Preysing from *Ziegler's Beitr.*, vol. xxv., caused hemorrhages on serous membranes and diarrhœas, by injecting only the toxins of streptococci.

Meningitis connected with otitis media need not be purulent. Dr. Francis Huber published a case of otitic serous meningitis which recovered permanently.[1] The patient was a child of two and a half years, suffering from adenoids and chronic aural discharge. There were general convulsions which returned frequently during the ten days preceding admission. There was semi-consciousness, the pupils were dilated, mainly the right; there was convergent strabismus and lateral nystagmus, rapid pulse, and taches. The tendon jerks were exaggerated. On the thirteenth day the mastoid process was opened, diseased bone removed, and the dura reached but not opened. Lumbar puncture was then made twice in two days, 30*ccm* and 16*ccm* of liquor were removed. It contained no bacteria. Twenty-two days afterward the child was discharged and remained well.

In the atrophic infants the bone, with the exception of some parietal swelling, was not found to be affected. Even in healthy children the bony wall of the antrum is very thin, and small abscesses are apt to perforate before giving rise to serious injury.

PREVENTION.

Nasal, post-nasal, and pharyngeal catarrh should be treated before they can do harm; adenoids removed, enlarged tonsils resected, and hypertrophy of the mucous membrane of the nose attended to. No operation about these parts is successful unless subsequent cleanliness be enforced. I have found that some operators neglect to avoid recurrences by not attending to that rule. One or two daily warm saline irrigations made *from a nasal cup*, during which

[1] *Am. Med.*, 1903.

the mouth should be kept slightly open—*not injections*—suffice for that purpose. Adenoids when small will get well without operation when these irrigations are gently and regularly made. Sprays or the use of droppers cannot take the place of irrigations. A spray of a .5 per-cent. solution of silver nitrate through the nares once a week will work well. This application should be made several weeks in succession.

TREATMENT.

A child with an acute otitis media should be in bed, the head and trunk raised. The raising of the head alone may lead to annoyance of the circulation of the neck. No feather pillows under the head. Symptoms will be ameliorated by a mild antipyretic, a narcotic, a purgative. Politzer and Valsalva are not adapted to the acute stage. Severe pain may be relieved by a few drops of cocaine solution instilled into the ear, occasionally by a leech on the mastoid process. Warm fomentations with spongiopiline, or simple warm wet cloths without or with antiseptic solutions should be tried. When pus forms the posterior half of the membrane bulges first; at its edge the hammer is distinguished. When an incision is required it should be made posteriorly and inferiorly. The expulsion of the pus through the incised wound can be facilitated by Politzeration, but this procedure may drive pus into the cells. Injections into the external canal should—if at all, be made toward the wall of the canal. Their advisability is favored and denied in equally strong terms. I do not use them. More than a dozen years ago I learned from my specialist friends the use of boric acid. After the ear has been wiped out with absorbent cotton it is filled loosely with boric acid. When this is softened with pus, the ear is again cleansed and the process repeated. This procedure has proved so successful that I remain true to the advice of my friends. I have often been told since that the method is bad and that injections into the external canal should be preferred, but I have read of deaths that have occurred after injections in the practice of such men as Troeltsch, Fraenkel, and Katz, and I cannot

help appreciating the fact that enough people die without our aggressive co-operation.

To what extent sepsis depending on otitis media, pure or complicated, can be benefited, is uncertain. Anti-streptococcus serum is of very doubtful efficacy. Credé ointment may be used with a certain amount of confidence. It should be applied once or twice a day. The inunction should last half an hour, and absorption facilitated by the addition of a few drops of water to the ointment. Collargol acts more rapidly when dissolved in sterile water and injected into the rectum. Large quantities of water, drunk, injected into the rectum, or under the skin in the usual cautious way, are known to cause copious elimination from the blood, and deserve all the praise which has again been bestowed upon them by B. Alexander Randall in an article on "The Treatment of Otitic Septicæmia," which appeared in the *Journal of the American Medical Association* of November 26, 1904. Nuclein may be tried internally.

A. Bronner, of Bradford, England,[1] publishes his opinion on the local treatment of some forms of non-suppurative catarrh of the middle ear by compressed air and a nebulizer, recommending for the purpose the compressed-air apparatuses used in America. He is careful enough to add what he takes to be a fact that many cases of so-called dry catarrh of the middle ear are not due to any affection of the mucous membrane at all, but to a primary disease of the osseous labyrinth. In these cases the use of the catheter can do a great deal of harm. If sudden great pressure be applied, the hearing and tinnitus may become worse. In dubious cases he uses the catheter with an iodine spray under very low pressure. It seems probable that in many of these cases we have after all to deal with the results of former inflammations that resulted in thickening of the mucous membrane. It is in these cases, though they be not syphilitic, that the internal use of an iodid or of "mixed treatment" may be expected to do good. But as a rule, and that I emphasize more than anything else, chronic disease of the mucous membrane of the ear will never get permanently

[1] *British Med. Journal*, November 5, 1904.

cured unless the chronic catarrh of the naso-pharynx receive constant attention. After all, the treatment of non-suppurative disease of the middle ear is rather ineffective. Nothing is more corroborative of this old experience than the discussion lately held in the *British Medical Association* by eighteen gentlemen, well-known in their specialty and literature, a few of them our own fellow-countrymen.[1] The latest paper on "The Present Status of the Treatment for Deafness Due to Chronic Catarrhal Otitis Media," published by Dr. Philip D. Kerrison in the *Journal of the American Medical Association*, November 12, 1904, expresses itself in the same strain.

[1] *British Medical Journal*, November 5, 1904.

THE OPERATIVE TREATMENT OF DISEASES OF THE EAR IN CHILDHOOD.[1]

By EDWARD BRADFORD DENCH, M.D.

THE operative treatment of aural disease in childhood does not differ materially from the treatment of similar conditions in older patients.

For convenience, in consideration of the subject in the short time alloted to me, I have divided my remarks as follows:

The operative treatment of acute otitis media.

The operative treatment of the complications of acute otitis media.

The operative treatment of chronic non-suppurative middle-ear inflammation, and

The operative treatment of chronic purulent middle-ear inflammation.

Under the first head—the treatment of acute otitis—in considering acute otitis in childhood, I shall not attempt to separate in this paper the acute catarrhal form from the acute purulent form. We may divide the treatment of acute otitis into, first, the treatment during the attack, and, second, the interval treatment. Whenever, in childhood, we find a patient suffering from an acute inflammation of the middle ear, giving rise to a persistent increase in temperature, operative treatment is imperatively demanded. In only one way can the surgeon relieve the local condition, and save the patient either from a serious menace to his life or serious danger of permanent impairment of the function

[1] Read at meeting of New York Academy of Medicine, under auspices of Section on Otology, December, 1904.

of audition. Early and free myringotomy, in all cases of acute otitis in childhood, is urgently called for. The younger the patient, the earlier should this simple operation be performed.

As to the method of incising the drum membrane, perhaps a few words may not be out of place. Excepting in very young infants, I believe that the operation should always be performed under general anæsthesia. In young children, chloroform is probably the best anæsthetic, while in older children, nitrous oxide gas is the ideal drug to use.

The incision in the drum membrane should be exceedingly free. It should extend from the lower pole of the *membrana tympani* upward and backward, following the posterior peripheral attachment through the posterior fold, and well upward into the tympanic vault. Where there is any sinking of the upper and posterior canal wall, the incision should be carried well outward on to the superior wall of the bony meatus. In this way, free drainage, not only of the *atrium tympani* but also of the tympanic vault, is secured; while the incision on the upper wall of the canal, by dividing the periosteum over the floor of the antrum, tends to relieve the congestion in this region, and to favor the resolution of the inflammatory process which is spreading in this direction. In addition to this long posterior incision extending on the canal wall, as above stated, I frequently make a horizontal incision, at right angles to this, backward from the short process of the malleus, the blade of the knife being introduced flat-wise, just above and behind the short process, and being carried upward, backward, and inward into the tympanic vault and made to cut its way backward until it joins the vertical incision already mentioned. This secures very free drainage, and I am confident, when performed early, in many cases prevents the extension of the disease to the mastoid.

In very young infants it may be argued that general anæsthesia is not necessary. I can only say, with increasing experience, that I am more inclined to anæsthetize each patient, in order that the operation may be carefully and properly performed. It goes without saying that proper

aseptic precautions must be taken in performing this operation. The external auditory canal is sterilized, previous to operation, by mopping it out with an alcoholic solution of bichloride of mercury, of a strength of 1 : 3000. All instruments used are sterilized, either by boiling or by exposure to formalin gas.

By exercising care, in regard to these details, the best results are obtained.

This, I think, covers the treatment of acute otitis. Better occasionally that the surgeon should err by doing a myringotomy on a case where resolution might take place, than that he should wait too long, in a single instance, allowing the disease to extend to the deeper parts. A myringotomy properly done will do absolutely no damage. Delay this simple procedure for twenty-four hours, and no one can tell how much injury may result to the patient.

In speaking of acute otitis, I mentioned what I called the *interval treatment* of acute otitis. We are frequently asked to examine children where the following history is given: The child has suffered from repeated attacks of earache, but not intense enough to require the attention of the otologist. The patient has, perhaps, been restless for a few nights and, if old enough, has complained of pain in the ear. There has been some slight increase in body temperature with each attack, but the symptoms have disappeared at the end of a few days, sometimes accompanied by a slight aural discharge, but more frequently no discharge has been present. It is in just these cases that the best results can be obtained. What we must strive to do is to prevent a recurrence of these attacks. An examination of these patients almost invariably reveals the presence of adenoid vegetations within the pharyngeal vault, together, in many instances, with enlarged faucial tonsils. The otologist does not do his duty unless he insists, in these cases, that the lymphatic tissue in the fauces and pharyngeal vault be thoroughly removed. In other words, complete tonsillotomy and adenotomy should always be performed in children who present with the preceding history. Not only may a serious acute inflammation be averted, but, what is, perhaps, quite as important, these

slight recurrent attacks may be absolutely stopped, thus preventing the development of a chronic catarrhal inflammation within the middle ear. There can be no question that many of the serious chronic catarrhal inflammations of the middle ear, seen in adult life, are the result of neglected acute catarrhal inflammations in childhood.

Turning now, to the complications of acute middle-ear inflammation,—these are:

1. Extension of the inflammatory process to the mastoid.
2. Extension to the lateral sinus or jugular bulb, causing a sinus thrombosis.
3. The extension to the meninges, causing either a localized meningitis or epidural abscess, or a diffuse meningitis, either serous or purulent; or
4. Extension to the brain substance itself, with the production of a brain abscess, either cerebral or cerebellar.

I purposely consider these conditions as complications of acute middle-ear inflammation because, in the majority of cases, the symptoms are urgent, and constitute practically an acute condition. We must always remember that whenever we have a chronic suppurative inflammation within the middle ear, that an acute condition may be grafted upon this chronic process, giving rise to sudden and alarming symptoms. It is the experience of all who have to deal with ear cases, that the most severe intracranial complications usually follow an acute exacerbation of a chronic purulent inflammation. Under these circumstances, however, the urgency of the symptoms makes the case generally an acute case, and it is the acute inflammation and its sequel with which we have to deal.

I, therefore, take up the consideration of the treatment of these complications of middle-ear inflammation, immediately after the treatment of acute otitis media, although, as before stated, the acute condition may be an exacerbation of the previous chronic process.

The operative treatment of these conditions varies but little from the operative treatment of similar conditions in adult life.

Considering the various lesions, *seriatim*, I would say that

in dealing with mastoid involvement in children, I am inclined to operate at an earlier period in childhood than in adult life. The external auditory canal in the child is relatively much narrower than in the adult, and drainage along this channel is correspondingly less free. Moreover, the mastoid process in early childhood is but poorly developed, and an inflammatory process spreading from the mastoid is much more prone to extend to the cranial contents, particularly to the meninges, than it is in adult life. We know that in early childhood certain dehiscences are not uncommonly found in the tympanic and antral roof, through which processes of the dura extend, and thus infection within the middle ear or mastoid may rapidly spread to the meninges. Early and free drainage, therefore, is of the utmost importance in childhood. As illustrating how poorly the middle ear drains through the external auditory meatus, we have all of us seen many cases of post-aural abscess, without rupture of the *membrana tympani*, the pus merely finding its way through the Rivinian segment and out upon the external surface of the skull before the drum membrane has ruptured.

In *all* cases, then, of middle-ear inflammation in childhood, where free myringotomy does not relieve pain and temperature at the end of a few days, the mastoid should be opened and the typical mastoid operation done, even upon no other indications than pain and temperature, and in young children considerable temperature elevation *alone* is a sufficient indication.

In performing the mastoid operation upon a young child, the surgeon should remember that the superior attachment of the auricle does not mark the location of the antrum. From the fact that in infancy the bony canal is practically wanting, the superior wall of the fibrous canal is applied to the external surface of the squama. It is necessary, therefore, in performing the mastoid operation in a young child, to expose the margins of the tympanic ring and enter the bone just behind the posterior superior tympanic spine in order to be certain of reaching the antrum instead of entering the middle cranial fossa. After the antrum has once

been entered, the entire overlying cortex should be removed. Although no tip cells are present in infants, I always make it a practice to ablate the entire mastoid process. In older children, where the pneumatic spaces are developed in the mastoid, the entire mastoid process must be ablated. All pneumatic cells must be thoroughly opened and cleared out, if we would eradicate every trace of the disease.

In very young subjects, it has been my practice to separate the margins of the mastoid wound considerably by packing at the first dressing immediately after operation, so as to facilitate the subsequent dressings. If this is done, the little patients are spared much unnecessary pain.

Infection of the large venous channels within the cranium may occur, either by direct extension from the middle ear, without secondary involvement of the mastoid process, or may be secondary to mastoid inflammation. While the latter condition is the more common, I have seen cases in which extension to the jugular bulb, with subsequent thrombosis, took place, without any involvement of the mastoid. The surgeon should always look with suspicion, therefore, upon marked intermissions in the temperature of the patient, whether or not there is any evidence of mastoid involvement. A temperature which varies from 99° to 100° at one time in the day, and then suddenly rises to 104° or 105°, only to fall to normal in the course of a few hours, should always lead the surgeon to suspect involvement of the lateral sinus. Naturally, in order to explore the sinus, the complete mastoid operation must first be done, but with these marked intermissions in temperature the mastoid operation alone is not sufficient, and the surgeon should expose the lateral sinus or, in case both ears are involved, both lateral sinuses. Even when the sinus appears perfectly normal to inspection and palpation, I am in favor of incising the sinus wall, and passing the curette downward toward the jugular bulb, in cases where these marked fluctuations in temperature persist.

In a case seen in consultation with Dr. McKernon, and operated upon by him, such radical treatment was the means of saving the patient's life. In exposing the sinus, the

surgeon must remember that it is necessary to expose it from just above the knee to a point as near the bulb as possible. If this is done, it is perfectly simple to shut off the blood current from above by pressure, incise the sinus close to the bulb, and remove any clot which may lie in this region. If a clot is found in the sinus, it should be removed absolutely—that is, until free hemorrhage occurs; hemorrhage from below, showing that the blood channel is open to the jugular, and hemorrhage from above, showing that the vessel is not blocked in the direction of the torcular. If free hemorrhage is not obtained from the lower end of the sinus, the internal jugular must be excised completely, to prevent general systemic infection. While these operations sound formidable, they are really exceedingly simple, can be performed readily, and, if not undertaken too late, will save many a life.

In some cases, infection spreads to the meninges, giving rise either to an epidural abscess or to a general meningitis. An epidural abscess or a localized meningitis is one of the most satisfactory conditions with which the surgeon has to deal. The diagnosis is seldom made before the operation upon the mastoid, and herein lies the importance of a complete and thorough mastoid operation. With a large operative field thoroughly exposed, the removal of all diseased bone will lead the surgeon to the discovery of any collection of pus between the dura and the skull, and its thorough evacuation will be followed by a prompt and complete recovery. In dealing with this condition, the surgeon should remember not to break down the adhesions which limit the abscess. All the bone should be removed to the very line of adhesions. To continue to remove bone, however, until absolutely healthy dura is reached, is a mistake. The adhesions are an effort on the part of Nature to prevent the extension of the inflammatory process, and this fact should never be lost sight of by the surgeon.

Quite different is the outlook where we are confronted with a general or diffuse meningitis, either of the purulent or serous variety. While I have never succeeded in saving a case of acute meningitis in a child, I have reported one case in adult life operated upon successfully. Infection, in

these cases, is sure to take place either through the tympanic or antral roof. If the diagnosis is made extremely early, the cranial cavity opened, and the site of infection packed off from the general cranial cavity by means of iodoform gauze, I believe that the patient may occasionally recover.

Where we suspect a beginning inflammation of the meninges, from a middle-ear process, the operator should expose the dura in the middle cranial fossa by a free incision extending well over the top of the ear to within half an inch of the external angular process of the frontal bone. The middle cranial fossa is then opened immediately above the external auditory meatus, through the thin squamous plate, and the opening enlarged upward and backward until an area of dura, at least an inch and a quarter in diameter, is exposed. The cranial contents are then carefully elevated from the tympanic roof, in order to discover any area of infection. If a perforation of the tympanic roof is discovered, this is packed off by means of iodoform gauze, so as to prevent an extension of the infection to the meninges.

Randall has reported successful results from washing out the subdural space with an antiseptic solution in cases of beginning meningitis. In spite of the most prompt and radical measures at the hands of the surgeon, however, a diffuse suppurative meningitis must, in the majority of cases, prove a fatal complication. In serous meningitis, however, it seems possible that we may look for better results. A number of cases have been reported, in which serous meningitis seems to have been relieved by successive lumbar punctures, thus relieving the intracranial pressure. Lermoyez, at the last International Congress, at Bordeaux, reported two cases successfully treated in this manner.

It goes without saying, that whenever these cases occur in conjunction with an otitis, in addition to the lumbar puncture, the surgeon must completely eradicate the local process by a thorough operation upon the middle ear and mastoid. It is in this connection that early drainage of the lateral ventricles may be of value. I have drained the ventricles of the brain in one instance for an acute serous

meningitis. The patient survived the operation about eight days, and subsequently died of a hemorrhage in the upper part of the spinal cord.

Whether ventricular drainage or lumbar puncture will be the proper procedure in these cases, experience alone will determine. My own plan at present would be to first clear out thoroughly the mastoid cavity, performing, if necessary, a radical operation, so as to eliminate the original focus of disease, at the same time to add a lumbar puncture, thus relieving the increased tension of the cerebro-spinal fluid. If this plan is not followed by improvement, I should then proceed to drain the lateral ventricles, if there was pressure above the tentorium, or drain the fourth ventricle by a deep incision through the cerebellum, if the pressure seemed greater in this region.

The treatment of brain abscesses in childhood is naturally the same as that of a similar condition in adult life. In young children, however, it is much more difficult to recognize the presence of a cerebral abscess, owing to the fact that, on account of the age of the patients, definite localizing symptoms are unobtainable. The diagnosis in these cases must depend upon the subnormal or moderately remittent temperature, choked disc, as recognized by the ophthalmoscope, emaciation, and slow pulse. The most frequent site of an abscess is in the middle cranial fossa, in the temporo-sphenoidal lobe. Next, we most frequently find the purulent collection in the cerebellum. In one case which came under my observation, an abscess was found in the temporo-sphenoidal lobe a few days after the mastoid operation had been performed. The abscess had practically given rise to no symptoms, excepting a high temperature. In spite of free drainage, the child subsequently died.

Whenever a brain abscess is suspected, the surgeon should not hesitate to explore the brain freely. The site of election for this exploration is the middle cranial fossa. The temporo-sphenoidal lobe should be exposed immediately above the external auditory meatus, the opening in the skull being not less than an inch and a half in diameter, and better, two inches and a half. If the dura seems to bulge in any one

locality, an incision should be made here and the brain substance incised by means of the scalpel. If the dura does not bulge over any particular area, I am in the habit of cutting a large dural flap, and reflecting this upward so as to expose the brain substance itself. The knife should then be introduced into the brain substance in various directions: at first, directly inward, then forward and inward, then forward, downward, and inward, and then forward, upward, and inward; next, it should be introduced upward and inward, then downward and inward, following parallel to the upper surface of the petrous portion of the temporal bone. If no pus is discovered in any of these localities, the brain substance should be incised backward, downward and inward, backward and inward, and backward, upward and inward. These incisions should be made with a sharp knife, should be not less than half an inch in length, and should vary from three quarters of an inch to half an inch in depth, according to the age of the patient.

It is never wise to trust to the aspirating needle to discover the presence of pus. The pus in a brain abscess is so thick that often it will not flow through the aspirating needle, and the needle may be plunged directly into an abscess cavity without any pus appearing in the aspirator. Free exploratory incision is the only feasible method of discovering these abscesses.

If exploration of the cerebrum is followed by negative results, the cerebellum should be explored in a similar manner. This latter is probably most easily explored by first exposing the lateral sinus, and then removing sufficient bone behind and below this to lay bare a dural area of sufficient size to allow of the reflection of a dural flap, at least three quarters of an inch in diameter, after which the cerebellar substance may be incised cautiously. It must be remembered that in young children the cerebellum is quite small, and if the knife is introduced for a greater depth than one half or three quarters of an inch, the operator is apt to puncture the fourth ventricle. This may be of service occasionally, in causing free drainage from the ventricles. The point to be borne in mind is that a cerebellar abscess would

scarcely lie more than one half an inch below the surface. Whether the abscess be found in the cerebrum or cerebellum, the cavity should be thoroughly drained, either by means of drainage tubes introduced into the cavity, or by means of a gauze packing. I do not approve of the irrigation of these cavities at the time of operation. Whether or not the finger should be introduced into the cavity, will depend on the choice of the operator. Personally, I am in favor of introducing the finger cautiously into a brain abscess, in order to break down any bands which may divide the cavity, and thus prevent free drainage.

Quite recently, Dr. Whiting, of New York, has devised an instrument known as the *encephaloscope*. This consists of a large metal speculum furnished with an obturator. The instrument is introduced into the brain and the obturator removed. This enables the surgeon to inspect the deeper portions of the abscess cavity, and to wipe out any broken-down brain matter which might otherwise not be removed. The packing of the abscess cavity can also be conducted through the encephaloscope in a very satisfactory manner.

After the abscess has been thoroughly evacuated, the cavity may be packed with iodoform gauze or plain gauze, or drainage tubes may be introduced, according to the choice of the operator. Unfortunately, the results obtained in an operation of this kind are, as a rule, unsatisfactory. Most of these abscesses have existed so long before they are discovered, that ventricular infection ultimately takes place, and the patient dies of a diffuse purulent meningitis.

After this cavity has been properly drained, or packed, according to the choice of the operator, the dural flap should be sutured,—a dural opening being allowed to remain only of sufficient size to permit either of the egress of the drainage tubes or of the gauze which is used to pack the abscess cavity. It is also wise to shut off the subdural space as completely as possible, from either the gauze drain or drainage tubes, by packing about the drains with a strip of iodoform gauze. Careful attention to this point will, I believe, save many cases, as quite frequently after a cerebral abscess has been successfully operated upon the patient later suc-

cumbs to a purulent meningitis. I am certain in my own practice that in at least one instance the meningeal infection occurred subsequent to the opening of the abscess.

When we come to speak of the chronic inflammatory processes which may involve the middle ear we have:

1st. Chronic non-suppurative otitis media; and

2d. Chronic suppurative otitis media.

In young children, naturally, the chronic non-suppurative variety of the disease claims but little attention. The surgical measures to be instituted for the relief of this condition have already been given under the treatment of recurrent acute otitis media. In other words, prevent the child from having successive attacks of acute inflammation within the tympanum, and in later life we shall rarely find a chronic non-suppurative inflammation in this region.

It is true, however, that certain of these cases appear to develop insidiously. It is the duty of every general physician to examine from time to time the nose and naso-pharynx of each child under his care, in order to avoid the development of a chronic inflammatory process within the tympanum. I believe that if this plan were followed, and if enlarged tonsils and adenoid vegetations were removed, as a matter of routine in every case, the otologist would see very few cases of chronic non-suppurative otitis media in adults.

I simply speak of the operative treatment of this condition as a prophylactic measure, and cannot impress too strongly upon my hearers the necessity of removing enlarged faucial and pharyngeal tonsils whenever present, in order to protect the patient against the insidious development of a chronic, non-suppurative middle-ear inflammation.

A chronic suppurative inflammation of the middle ear in childhood demands exactly the same treatment as in adult life. In child-life, if the patient is observed before the disease has existed for a considerable period of time, prompt non-operative measures may bring about a cessation of the suppuration.

First among these comes thorough and systematic cleansing of the ears, and irrigation with an antiseptic

solution such as bichloride of mercury. At the same time, the upper air passages must be put in a thoroughly healthy condition, so as to eliminate as far as possible any chronic congestion of the middle ear which may exist. This end is attained by the removal of enlarged tonsils, when present, and by the removal of adenoid vegetations, if these are found. The general hygienic surroundings of the child must also be borne in mind, and frequent colds should be guarded against by the daily use of the cold bath and the wearing of proper underwear.

Failing in these general measures, the suppuration can only be relieved by means of the radical operation. While I hesitate to advise the radical operation in very young children, I have seen exceedingly good results follow it in not a few cases. Where there is any sign of tubercular infection, either as evidenced by the general history of the case, or from an examination of the discharge from the ears, I should most emphatically advise the radical operation. I am not familiar with the statistics of primary tuberculosis affecting the auditory apparatus in children, but I believe that when this portion of the anatomy is affected in child-life, an early eradication of all diseased tissue should be insisted upon to prevent further systemic infection. It must be remembered, in operating upon these young subjects, that the length of time the patient is under the anæsthetic constitutes an element of danger. I much prefer, therefore, in young children to perform the operation in two sittings, namely, at the first sitting, to simply clear out the bone cavity and form a large meatal flap; this part of the operation can be accomplished in from one half to three quarters of an hour, or in an hour at the most. In a week or ten days the child is again anæsthetized, and the bone cavity lined with Thiersch grafts.

While the number of young children upon whom I have operated in this manner is naturally limited, the results have always been very satisfactory. In children of eight to ten years of age, I do not hesitate to do the complete radical operation in one sitting, if the child is in good condition.

A point to be borne in mind, in performing this operation

upon children, is to secure an exceedingly large and patent external auditory meatus. If this is done, the bony cavity becomes dry very quickly, and the dressings are not attended by much pain. If, on the other hand, the meatus is not made very large, the cavity dermatizes slowly, and the dressings are exceedingly painful to the patient, and can only be performed with difficulty.

I would certainly emphasize the necessity of performing these operations upon children more frequently than they are being performed. I believe that if this is done the number of serious intracranial complications occurring in later life will be greatly diminished.

There is one condition which, in closing, I think it may be well to speak of, and that is recurrent mastoiditis. We occasionally find that a child operated upon with apparent success for an acute mastoid inflammation, will appear later with a recurrence of this condition. On questioning, we usually find that the ear has never ceased to discharge. In other words, that, although the mastoid inflammation was successfully dealt with, a purulent otitis remained; later, from some unknown cause, reinfection took place, and we find when the child presents for treatment, either a tumefaction behind the ear, occupying the site of the old scar, or in some cases the old scar is broken down and a fistula has resulted. My experience has been that in these cases the recurrence of the mastoiditis is due to the fact that a purulent focus has been left in the tympanic vault. The only proper treatment for these recurrent cases is the radical operation. A repetition of the simple mastoid operation may relieve the condition temporarily, but recurrence is bound to take place unless the tympanic vault is freely exposed, and the only way to do this thoroughly is by performing a radical operation. As recurrent mastoiditis is more common in children than in adults, it seems to me that a proper method of treating these cases should be fully recognized.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOLOGY, REGULAR MEETING OF THE NEW YORK ACADEMY OF MEDICINE, DECEMBER 1, 1904.

DR. A. H. SMITH, PRESIDENT OF THE ACADEMY, IN THE CHAIR.

I. **The anatomy of the child's ear, emphasizing points of practical importance.** By WM. SOHIER BRYANT, M.D., published in full, p. 80.

The paper was accompanied by a most interesting exhibit of lantern-slides, and in closing Dr. Bryant introduced Dr. Carmalt, who had collected some valuable data concerning the calibre of the infantile lymphatics of the middle ear concerning which there is very little literature from the anatomical standpoint. Dr. Carmalt passed around a number of carefully prepared specimens showing that the lymphatic glands do not grow proportionately to the increasing age, nor do they greatly increase in number, nor is the distribution of these glands proportionately any greater in adults than in children. The size is about the same, except in pathological specimens, where it is greater in adults.

II. **The pathology of the infant's ear underlying aural and general disease.** By JOSEPH A. KENEFICK, M.D., published in full, p. 84.

III. **The inflammations of the ears of children, original or derived from other diseases; the main sources; nasopharyngeal affections, the acute exanthemata, cerebral-spinal meningitis, tuberculosis; their course and medical treatment.** By ABRAHAM JACOBI, M.D., published in full, p. 90.

IV. **The surgical treatment of diseases of the ear in childhood.** By EDWARD B. DENCH, M.D., published in full, p. 102.

Discussion.—Dr. L. EMMETT HOLT said that there were many interesting things remaining to be said on the subject of otitis in regard to etiology and diagnosis, but that he wished now to dwell on some other points. The ground where the general physician and the otologist usually meet is on the decision in regard to operative measures. Regarding the necessity of incising the drum membrane and its being done early there was no need of argument. All who see much of sick children with acute ear disease will agree on the subject of paracentesis. When properly performed there is no danger to the patient, and in case of doubt the operation should be done. The question upon which he desired to speak was with regard to the more serious operations, particularly those upon the mastoid. He thought there was much difference of opinion among both physicians and surgeons as to indications for this operation, his own view being that it was done more frequently at the present time than was necessary or wise. No one appreciated more than he the advantages accruing to patients by the advances made by surgery along this line, but he felt that there is a tendency to carry these proceedings farther than conservative medicine and surgery require. This was particularly the case with regard to operations upon the mastoid in infants and very young children. Dr. Dench had given as a sufficient indication the continuance of high temperature after paracentesis of the drum membrane. He thought this was going too far, and that in infants certainly no operation should be done without very positive indications. The specialist thinks chiefly or solely of the ear, but the general physician must think also of the child. The effect of so serious an operation upon the child's general nutrition was not to be lost sight of. A case seen last season was cited where a mastoid operation had been done upon an infant of five months where otitis had followed influenza. Though in fairly good condition previously, the child ran down steadily from this time. The wound did badly, necrosis followed, secondary operations were necessary, and the child finally succumbed at the end of three months. Such cases were not rare.

One should consider also the immediate dangers to which the child is exposed from the shock and from prolonged anæsthesia when pneumonia may possibly be just beginning, and in such patients he should therefore advise against operation where the only reason for urging it was that no other cause for a continuance

of temperature was apparent. He thought the frequency of mastoiditis as a complication of acute otitis had been exaggerated, as well as the cerebral dangers from mastoid cases not operated upon, particularly in young children. In support of these statements he gave the following statistics from the records of the New York Foundling Hospital for the past five years.

During this period there had occurred in the institution three epidemics of measles with a total of 1034 cases, 166 cases of scarlet-fever, 562 cases of diphtheria, and 88 cases of German measles, not to mention cases of influenza and catarrhal colds which had been very prevalent, but of which no reliable records had been kept. In the five years there had been recorded 551 cases of acute otitis and only 16 cases of mastoiditis. Possibly some cases of mastoiditis had not been recognized. If such errors in diagnosis had been followed by fatal consequences they should be revealed by the post-mortem records, since in this institution nearly all serious acute cases come to autopsy. During the five years 880 autopsies had been made. A search through the records showed the following facts: Cerebral abscess from otitis, no case; purulent meningitis following mastoiditis and sinus thrombosis, 2 cases, neither being operated upon; purulent meningitis from other causes, 12 cases; complicating pneumonia, 8; pericarditis, 2; empyema, 1; diphtheria, 1. Only 2 of 14 cases of meningitis (tubercular and cerebro-spinal cases being of course excluded) were associated with ear diseases.

The Foundling Asylum is not a hospital where sick children are admitted, but an institution of which the children were inmates when taken sick. In such institutions surely the frequency of otitis and the severity of its complications should be greater than is seen in private practice.

Of the 16 cases of mastoiditis recognized in the period of five years, 6 recovered without operation, and 10 were operated upon with 6 recoveries and 4 deaths, all of the deaths being due to the operation of the disease for which it was done. These figures of course are not conclusive, but they are extremely suggestive. He strongly believed that too many mastoid operations were being done, especially upon young children, that the dangers from neglect to operate had been greatly overestimated, while those of the operation itself were not sufficiently appreciated. He would say: "Never operate when in doubt." Older children bear the operation much better.

Dr. C. J. KIPP dwelt upon the importance of an ophthalmic examination in all cases where suppurative ear disease was suspected. He had been astonished to find in so large a number of cases in children with suppurative otitis media, hyperæmia and inflammation of the optic nerve where there were few or no signs of cerebral symptoms. He considered that the presence of optic neuritis indicated at least exploration for mastoid disease. He had seen cases in which the optic neuritis developed under his eyes in which the patient recovered without other operation than paracentesis of the drumhead, yet he would advise opening of the mastoid in such cases. The ophthalmoscopic examination should begin with the development of the otitis, as occasionally an optic neuritis from other causes is already present when the child comes under observation.

Dr. E. GRUENING stated that he had been connected with Mount Sinai Hospital for a period of twenty-five years, and had during that time examined the ears of the children in the pediatric service. It was very rarely necessary to perform any operation on the ear in that service. But there is also an aural service in the same institution, and he had at present twelve cases of mastoiditis in children. This simply shows that children suffering from mastoid disease are not generally found in the pediatric service. If the pediatric physician draws the conclusion that there is no mastoiditis because he does not see mastoiditis in his service, his conclusions are not correct. The operation for mastoid disease is certainly never undertaken without positive indications. He had observed many cases of otitis media in children with typhoid fever, but had never performed an operation for mastoiditis on any one of these children, inasmuch as they got well without it. In the discussion to-night, the observations made by Professor Ponfick, of Breslau, should have been mentioned. He made a large number of autopsies on children who had died from broncho-pneumonia or from gastro-intestinal troubles. In the post-mortem examination, the cause of the trouble was found to be an otitis media purulenta, and he concluded that the pulmonary or intestinal symptoms were due to the action of the pus, either by its being swallowed or inhaled, thus exerting an action in loco, or that the symptoms were due to the toxins of the pus. Dr. Gruening stated that he had repeatedly seen in the practice of the pediatric physician children suffering from broncho-pneumonia or gastro-intestinal catarrh where the usual

remedies did not produce the desired effect, and that examination of the ear proved that the trouble was there. It is by no means an easy matter to make an otoscopic examination in such cases. It is much easier to make an ophthalmoscopic than an otoscopic examination. In the pathological demonstrations tonight, it was shown how the epidermis covering the drum thickens, and how it rises up in folds. Now when you look clinically at such an ear all the landmarks are wanting. There is no hammer, no light reflex, no folds, no redness, no swelling, nothing to guide you, and when such a membrane, showing absolutely no characteristic signs, is opened, pus is generally removed, and the children speedily get well of their broncho-pneumonia or their gastro-intestinal catarrh.

Dr. BACON spoke of the importance of investigating the pus from the middle ear. He thought that before deciding whether or not to do a mastoid operation it should first be determined whether the pus contained streptococcus, pneumococcus, or staphylococcus. The diagnosis, and especially the prognosis, depended very much on the presence of these germs. We can wait longer if we have a staphylococcus infection, but if there is a streptococcus or pneumococcus infection we cannot wait very long, for there is great danger of the disease extending from the mastoid cells into the sinus. In regard to anæsthetics, Dr. Dench had said that he administered chloroform in the case of very young children, and nitrous oxide to older children. He had seen cases of children starting in with tonsillitis, where the ear became involved, followed by a slight bronchial affection. We should be cautious in administering an anæsthetic in such cases, for fear of setting up a pneumonia. He took exception to the statement made by Dr. Dench, that he opened the mastoid cells in children when the temperature remained high after the drum membrane had been incised. Dr. Bacon considered this dangerous advice, for he had frequently seen young children who had had an attack of grippe, complicated by acute suppurative otitis media, and in whom the temperature remained high after the drumheads had been freely incised. The temperature in these cases was caused by a latent pneumonia, which did not give any physical signs for two or three days. He could not endorse the advice given by Dr. Dench to plunge the knife in different directions in the temporo-sphenoidal lobe in cases of suspected brain abscess for fear of dividing a blood-vessel and causing

hemorrhage. He preferred after incising the dura to insert a director in different directions.

Dr. QUINLAN wished to emphasize the dangers attending the presence of diseased lymphoid tissue. Hypertrophied faucial, pharyngeal, and tubal tonsils were frequently operated upon in a very crude fashion by the general practitioner with his office outfit, but more often diseased tissue was left to start up fresh trouble at every cold. He had recently seen a case of post-auricular swelling with every indication to denote the presence of an abscess in the mastoid process. This boy had been operated on for adenoids and enlarged tonsils, but the operation had not been thoroughly performed. To-day, instead of doing a tonsillotomy, a tonsillectomy should be performed; instead of adenotomy, an adenectomy. Referring to indefinite cases, accompanied by a peculiar redness of the membrane and frequently recurring attacks of catarrh, but no hypertrophy of the faucial masses, he thought that in many instances an application of nitrate of silver would not only deplete, but would render the cavity aseptic and allow a catheter to pass. He had had excellent results in two cases with this method. He condemned Dr. Jacobi's method of irrigating through the nose, on account of the difficulty of getting the child to submit to it; it is natural for all children to struggle against such a procedure. He also disapproved of Dr. Jacobi's use of powdered boric acid. The substance becomes packed in the cavity, mixes with the secretion, and you can hardly remove it with a spoon curette. The question of whether or not to operate for adenoids and hypertrophied tonsils in acute cases will continue to come up from time to time, but he thought that all the affected tissues should be removed whenever they are hypertrophied, and give nature a chance to establish a better phagocytosis.

In regard to the operation of paracentesis, he urged the importance of thoroughly cleaning the canal, and the use of sterile solutions and bichloride before the operation, in order to render it absolutely aseptic and prevent the carrying of infection into the middle ear. In addition to this, he advised the proper clothing of the children and the use of tepid- or cold-water bathing, which he regarded as a great cure for such vaso-motor disturbances. By keeping up the health of the children by such means as air, sunshine, proper diet, and light but warm garments, you immunize these little ones, so that the infection is to a large extent minimized.

Dr. ROBERT LEWIS also took exception to the practice of filling the ear with powdered boric acid. The object aimed at is to establish drainage, and with that end in view a large incision is made in the drum membrane, and the canal is cleansed with either a sterile or an antiseptic solution. The solution is not used with the idea that it may pass into the tympanic cavity and render the pus less virulent, but it is used to prevent the accumulation of the purulent exudate in the canal and thus assist in the proper drainage of the middle ear. Boric acid cannot render impotent the bacteria in the middle ear, and it can only do harm by caking and forming an obstruction to the free flow of pus. He thought it advisable that the canal should be kept as sterile as possible, and therefore, as well as to further assist the drainage, a wick of sterile or iodoform gauze should be inserted after each douching. The gauze should be renewed before it has become fully saturated.

In the early stages of acute catarrhal otitis media he had obtained excellent results by making an application of adrenalin (full strength) to the mouth of the Eustachian tubes.

In regard to early operative measures, he thought it inadvisable to be too conservative, because if a case were allowed to run too long a destructive process was established which necessitated a more extensive operation than the one for a simple mastoiditis: for in infancy there is little resistance to destructive processes, and the amount of necrosis present in cases where operative measures have been too long delayed has often rendered necessary the performance of the more radical Schwartze-Stacke operation.

Dr. TOEPLITZ said that Dr. Jacobi had stated that if there is a glandular swelling over the mastoid we should open and remove it. He himself had had several different instances in some of which this was indicated and in others it was not. In one case it was only a forerunner of rubeola, the second case was due to a traumatism of the skull, and in the third case there was a mastoid suppuration on the right, a cervical abscess of the same side, and a glandular swelling over the left mastoid. He had operated the mastoid and cervical abscess on the right and much pus came out, and under the left swelling there was also pus. Taking it all in all he did not think that glandular swellings always indicated mastoid disease.

Dr. JACOBI said that he had gotten it pretty hot and heavy but

that he thought the English language had been treated worse, and protested against the misinterpretation of his words. He said that for forty years he had written and spoken against the forcible treatment of struggling children, and that the easiest way to kill a diphtheritic child was to force a swab into its throat and make it struggle and die of heart failure. The only way to get at the throat of such a child is by irrigation through the nose, by means of a glass cup (Whitall Tatum, Bermingham, Dessar), and if that is properly done there is no milder treatment. The worst that can happen is that the child may swallow a little sodium chlorid solution or some other mild fluid. Then as to boric acid—I did not say that you must ram boric acid into the tympanic cavity. If you pour boric acid loosely into the external ear the pus will soften it, and it can be easily removed, and there is no interruption to the drainage. I believe I am not mistaken in the good that practice does, and I have continued it.

Irrigations are made by the mother or the nurse, and she does it twice a day, and keeps it up for months, and that is very often the end of the chronic nasal catarrh. There is no difficulty about it, and Dr. Quinlan may yet learn it, but it must be done regularly and for a long time. Without these irrigations, no treatment will do any good, and most of your operations are not so permanently successful as you wish them to be.

Dr. DENCH said that he had nothing to add excepting that there might be some misunderstanding about operating for no indication excepting temperature. He certainly did not say that in his paper. In deciding the question, any general disease was naturally excluded, but the danger was in waiting too long. Dr. Holt's statistics were very interesting, and he was impressed by them, but he had the statistics of several of the large hospitals abroad and knew that the number of fatal cases from meningitis and other intracranial complications was much greater than Dr. Holt's statistics would indicate. That might be explained by the fact that in the institution quoted by Dr. Holt most of the cases were not admitted as patients but were inmates of the institution living under proper hygienic conditions, and any disease was properly treated from the beginning.

Regarding the use of the knife in exploring the brain substance, he thought that if the incisions were made in the long diameter of the convolutions, rather than transversely, there was

practically no danger of hemorrhage. Of course, as to whether the knife should be used or a director, as suggested by Dr. Bacon, was a matter of personal preference. Dr. Dench certainly believed that the knife inflicted less traumatism upon the cerebral substance, and was a more certain means of making an exploratory incision than was the director.

REPORT OF THE TRANSACTIONS OF THE NEW YORK OTOLOGICAL SOCIETY.

By Dr. ARNOLD KNAPP, Secretary.

MEETING, JANUARY 24, 1905. THE PRESIDENT, DR. E. B. DENCH, IN THE CHAIR.

Dr. Whiting stated that he had recently seen three cases of **children with acute otitis where the temperature remained high and pneumonia developed.**

The first case was a child with a temperature of 105° F. There were no special symptoms. As no other cause for the fever could be discovered, he was asked to examine the ears. In one the drum was red, in the other it was very red. The posterior half had the characteristic grayish appearance due to exfoliated epidermis. Paracentesis was performed. The temperature did not diminish and remained over 105° for three days. Bacteriological examination of the discharge from the ear showed pneumococcus infection. On the sixth day a central pneumonia was found to be present. The other ear subsequently became affected. The ear trouble did not proceed, and the patient recovered.

Case 2, a young man with high temperature for which no cause could be found on physical examination. The ears presented the same picture as in the preceding case. The discharge was muco-serous in character and contained pneumococci. The temperature kept up though the ear condition did not seem to be aggravated. On the third day pneumonia developed with rapidity and assumed a malignant character, and the patient died on the ninth day. Throughout the disease the ear lesion was very mild.

The third case was that of a child of five years, also with a

high temperature, with muco-serous fluid collected in the posterior segment of the drum. In this case pneumonia also developed.

He thought these three cases illustrated a very interesting and important condition which was probably familiar to most of the members of the Society. Though the ear symptoms in all cases were not severe and subsided, the high fever kept up but was finally explained with the onset of pneumonia.

Discussion.—Dr. BACON said that some years ago he had drawn attention to the danger of giving anæsthesia for paracentesis of the ear in those cases where a lung complication was probable. He had also seen cases where the pneumonia developed a number of days later after the ear trouble. He thought that with this experience in mind we should not be hasty in judging of the presence of mastoid involvement.

Dr. HERMAN KNAPP stated that the pneumococcus infections of the ear were probably the most frequent, and that it is only rarely that a pneumonia supervenes.

Dr. SHEPPARD related an experience which he had had in the case of a child with a temperature of 105°, where a general surgeon was prepared to operate on the mastoid. He found the translucent drums yellowish from retained pus. He opposed operation and advised paracentesis. This was performed, and pneumonia developed four days later.

Dr. HASKIN said he had recently observed the case of a woman, twenty four years of age, with a temperature of 104°, who had been ill for two days. The drum was bulging, the mastoid extremely tender. He decided to operate immediately, and found an immense amount of destruction in the mastoid process, and also a perforation at the tip, with an abscess in the neck. After the operation, the temperature remained high. This was finally explained by finding an area of circumscribed pneumonia directly over the liver. He was uncertain whether to regard this as an associated infection or as an example of metastasis.

In connection with a **fistula forming in the post. meatal wall after mastoiditis,** Dr. HASKIN spoke of a woman whom he had been watching on account of an acute ear trouble, where hospital treatment could not be pursued because she was nursing an infant. The tip remained particularly sensitive for three weeks, otherwise she did perfectly well. Then a furuncle appeared in the canal. This ruptured, leaving a fistula which

entered the mastoid process, and which has discharged freely, with entire relief of tenderness.

Discussion.—Dr. WHITING stated that in his experience these fistulæ were not unusual, especially in children, and usually in the inner third of the meatus. They present the picture of a bulging mass of granulations.

Dr. BERENS had seen two similar cases in babies.

Dr. SHEPPARD recollected a case in a child of granulations coming from the posterior wall of the meatus in the depth of the canal, which presented such a color and aspect as to make him suspect tuberculosis. After shrinking with alcohol, a fistula could be seen which led to the mastoid ; this was operated upon, and the case recovered normally.

Dr. DENCH had recently seen a case where there was a perforation at the extreme outer margin of the meatus. The patient did not permit an operation. The doctor had recently heard that he had recovered.

Dr. HERMAN KNAPP spoke of a recent case upon which he had operated, in which he had found a compact mastoid, except for a number of very minute cavities. The patient had not shown any very marked symptoms; the tip, however, was quite tender. At operation, there was no supra-meatal spine visible, and the antrum was exceedingly small. At present the bone in the upper part of the wound was distinctly infiltrated. He regarded the condition as a disseminated osteitis, or as an osteomyelitis in a diploic mastoid.

Dr. WHITING inquired whether the zygomatic cells were not involved in this case.

Dr. KNAPP replied, No; that the lesion appeared to be of the bone farther down and back.

Dr. BRYANT thought from the description that the case was one of a pneumatic mastoid, and that the morbid process should be regarded as an osteomyelitis.

Dr. HEPBURN related a case in which he found a polyp in the depth of the canal, which was located at a sinus leading into the mastoid. The drum was intact. The patient, after removal of the polyp, apparently did perfectly well, until after five years he returned with granulations in the same place.

Dr. ALDERTON thought that these instances of fistulæ in the walls of the canal simply meant that they were cases in which the posterior wall happened to be the thinnest wall of the

mastoid, and that consequently perforation took place in that part.

Dr. BRANDEGEE related a case which he had recently operated upon, unusual on account of the **abnormal development of the zygomatic cells on both sides.** The patient had a temperature of 104°, was covered with perspiration, and seemed very septic. There was enormous destruction of both mastoid processes, and also an unusual development of cells in the root of the zygoma—so much so that a probe admitted at the anterior wall of the mastoid could be passed forward two inches through the zygomatic process.

Dr. WHITING in this connection spoke of a child he had seen where an incomplete mastoid operation had been done. The side of the head became enormously swollen and the eyelids were so œdematous that they could not be opened. The picture appeared like one of a cavernous sinus thrombosis. On examination, he had found an unusually tender area directly back of the external angular process of the frontal bone on that side. He advised exposing this entire region, which he then did, and found the bone in this unusually tender region exposed, superficially perforated, and was able to pass a probe backwards from this perforation to the zygomatic cells. This tract was laid bare, and the zygomatic cells, which were, of course, the starting-point of this extension, were thoroughly eradicated. He thought that this part of the field of operation was frequently neglected, and spoke of the importance of always searching for these cells.

Dr. ALDERTON had encountered unusually developed cells in the zygomatic region at all ages.

Dr. PHILLIPS related a case of **extensive operation for chronic purulent otitis** and spoke on **nerve anastomosis in facial paralysis.** A woman had had a mastoid operation performed twelve years ago, with apparently an extension into the neck, because below the mastoid and in front of the sterno-mastoid muscle there was a deep excavation. A fistula in this situation led ¾ inch inwards. There was an almost complete facial paralysis. He operated upon this patient and found that the sinus ended apparently blind below the external canal. The mastoid antrum had not been opened and he thoroughly exposed all the middle-ear cavities. The wound apparently did very well and remained healed for a considerable length of time, then after a fresh cold, reinfection of the cavities took place

with renewed discharge. Owing to the recent attempts to anastomose the facial nerve with either the hypoglossal or the spinal accessory in cases of facial paralysis, and as Dr. A. S. Taylor had had fair success in two cases, he decided that at the next operation which he should undertake to cure the discharge from the ear an attempt should also be made to connect the nerve trunks. After the second radical operation, Dr. Taylor proceeded to make an incision along the anterior border of the sterno-mastoid below the ear, and searched an hour and a half in vain for the facial nerve.

Discussion.—Dr. BERENS stated that an anastomosis with the spinal accessory had been in general abandoned in favor of the hypoglossal nerve. He inquired whether the stylo-mastoid foramen was found.

Dr. PHILLIPS replied, No.

Dr. ALDERTON said that he had recently observed two patients upon whom Dr. Bristow, of Brooklyn, had operated for facial paralysis of long standing. In the first case the nerve was easily found; in the other case, where the paralysis was of many months' standing, the nerve was found very much disorganized, yellow, and shrivelled. Dr. Alderton said he could very well understand that if this disorganization should continue a stage must supervene where the nerve would no longer be recognizable.

Dr. BRYANT quoted a case which had been operated upon by Dr. Keen, of Philadelphia, in which also the nerve was found too disorganized to attempt anastomosis.

Dr. DENCH said that Ballance sometimes performed this operation in two stages, exposing the spinal accessory or hypoglossal at the first sitting, and, if the search for the facial was a difficult one, this was postponed for a second operation.

Dr. BRYANT said that after a study of the reported cases of this nerve anastomosis he had not been able to encounter any satisfactory results which warranted the undertaking of the operation.

Dr. DENCH said that in his experience permanent facial paralysis was an extremely rare sequel to the radical operation. This was true of all cases, even those in which the facial paralysis came on immediately after the operation, and appeared as soon as the patient recovered from the general anæsthetic. He had seen these cases persist for eight or nine months after the operation, and yet ultimately recover.

Dr. HARRIS had recently seen a patient whom he had treated ten years ago. The case was one of residual purulent otitis, who told him that while travelling in Mexico at a high elevation in the mountains, when the others could not hear so well, her hearing was improved, to again return to its former condition on descending to the usual level.

Dr. HASKIN had observed a somewhat similar case in a patient suffering from chronic aural catarrh, who, in travelling across the Rocky Mountains, found her hearing improved, while the other normal-hearing persons had difficulty with their hearing.

Dr. BRYANT asked whether it was not a similar phenomenon which followed the use of the catheter.

Dr. HASKIN thought that this did not explain the condition, as the two tubes in his case were patent and the air pressure must have been the same on both sides of the drum.

Dr. DENCH inquired whether the improvement in hearing was for all sounds or for conversation only. The improvement in the power to hear conversation more distinctly, he said, might be explained by the fact that those with normal hearing might have been rendered somewhat deaf on account of the low atmospheric pressure. These individuals would necessarily raise their voices in talking, and their companions, whose hearing was impaired, might therefore hear them more distinctly, and assume that the change in the atmospheric pressure had caused some improvement in the hearing.

Dr. HASKIN showed a **dental syringe** which consisted of a medicine-dropper with a platinum wire tip. This could be bent and was useful in placing medications at certain regions in the tympanum and attic.

Dr. ALDERTON asked the opinion of the Society whether concussion of the brain from the mastoid operation can be considered a predisposing factor in causing leptomeningitis. A patient two weeks after an injury (a fall in which the mastoid process was struck, but no rupture of the soft parts nor of the bone) developed mastoid symptoms. He was called in and found the external ear-canal obstructed by a plug of wax. After removal, the drum appeared congested and slightly bulged, but no perforation. The mastoid was opened and the cells were found to contain pus. The case did apparently perfectly well for two weeks, and then suddenly meningitis set in, which rapidly led to the patient's death. At autopsy there was no connection between the petrous

bone and the meningitis. The dura over the base of the skull was abnormally separated from the underlying bone. The sinuses all contained fluid blood. There was well-marked purulent leptomeningitis with areas of superficial ulceration of the brain. The mode of infection of the brain was thus not explained by the autopsy, unless the infection took place through the lymphatics.

Dr. ARNOLD KNAPP inquired whether any symptoms of labyrinth involvement were observed?

Dr. ALDERTON replied that it was not possible to make a complete examination.

Dr. KENEFICK related the case of a boy who after a fall developed a typical cerebro-spinal meningitis during the past summer. This was followed by the characteristic gait. He now applied at the Infirmary for treatment for deafness.

Dr. PHILLIPS said that there was considerable literature recently published upon the variety of metastatic inflammations, especially of the joints, which are seen after mastoiditis, and this had raised the question in his mind whether the mastoiditis was not possibly a metastatic infection from some other source. For instance, he had recently observed a case of mastoiditis occurring six weeks after an operation for appendicitis.

Dr. QUINLAN had also observed a case of mastoiditis occurring three weeks after an operation for appendicitis.

Dr. ARNOLD KNAPP related a case of **severe vertigo due to caries of the labyrinth cured by operation.** The patient, male, twenty-five years of age, had a chronic purulent otitis of many years' standing, though the only symptom now was very distressing vertigo. The vertigo recurred a number of times every day. On examining the ear, a large central perforation was found. There apparently was no cholesteatoma, nor any retention to explain the vertigo, except that, upon investigation with a probe in the region of the descending process of the incus, a mass of granulations was encountered. He thought that this presumably was in connection with the stapes and advised an operation. At operation considerable caries was found in the posterior segment of the tympanum, and the previously observed mass of granulations was found to be adherent in this region and to extend through the oval window into the labyrinth. No stapes was found present. The operation was performed four weeks ago. The attacks of vertigo have ceased.

REPORT ON THE PROGRESS IN OTOLOGY DURING THE FIRST QUARTER OF THE YEAR 1904.

By Dr. ARTHUR HARTMANN, Berlin.

Translated by Dr. Arnold Knapp.

ANATOMY AND PHYSIOLOGY.

1. **Zuckerkandl.** On the Eustachian tube of the ant-eater. *M. f. O.*, 1904, No. 1.
2. **Falta.** An important anomaly of the naso-lachrymal duct. *M. f. O.*, 1904, No. 3.
3. **Breuer.** Studies on the vestibular apparatus. *Sitzungsber. d. Wiss. in Wien. Mathem.-naturw. Klasse*, vol. 112, Nov., 1903.
4. **Urbantschitsch.** On the localization of sound perception. *A. f. Ges. Phys.*, vol. 101.
5. **Rethi.** The secretory nerves of the soft palate. *Wiener med. Presse.*, Nos. 5 and 6, 1904.

1. Opposed to the view expressed by Hyrtl in his paper on the auditory organ, 1845, that the bony tube is apparently absent in the *Myrmecophaga jubata*, Zuckerkandl has examined macroscopically and microscopically the skull of the ant-eater and finds that this animal possesses an Eustachian tube, about 15*cm* long without any cartilaginous fundament, which is attached to the margin of an opening in the temporal bone and by this communicates with the tympanum. The author believes that this opening has been mistaken for the carotid foramen by Hyrtl.

Piffl.

2. In a woman forty-three years of age, who was being treated on account of purulent dacryocystitis, it was found, on probing the naso-lachrymal canal of the right side, that the canal did not, as is usual, terminate between the lateral wall of the nose and the

inferior turbinal, but passed superficially from the middle meatus over the inner aspect of the lower turbinal and terminated at its free border. The naso-lachrymal canal of the left side had a normal course. The cause of this deformity, which has previously not been described, is supposed to have been a premature closure of the fissure which exists in fœtal life between the eye and the nose.

Finally the author draws attention to the increased danger of injury which such an abnormally placed naso-lachrymal duct encounters from intranasal operations on the lower turbinal.

PIFFL.

3. This study consists of four sub-divisions which are not in direct connection.

Chapter I. presents anatomical contributions, especially on the finer histology of the cupula terminalis which BREUER definitely regards as an organized tissue present in the living and not an artefact. The anatomical structure of the cupula has led him to the conclusion that his opinion, expressed in 1875, is incorrect, in which he regarded the cell hairs as curved and deformed by the motion of the endolymph and that thus the nerve terminals are excited. The cupula can only be moved as a whole. It is, moreover, impossible that these hair cells can transmit sound perception as they are connected to the cupula by mucus. The supposition which Ewald has advanced is also untenable, viz., that the cell hairs are moved and act like ciliated epithelium. Breuer believes that the ampullary apparatus is influenced by positive and negative angular velocities and not by permanent ones. These produce a momentary displacement of the endolymphatic ring and of the cupula, and thus the hair cells become stretched and the nerve apparatus on one side of the crista is irritated. These produce, as long as they exist, the sensation of rotation, which continues until the normal condition is again restored by a counter blow from the negative acceleration on cessation of rotation or the slowly working elasticity of the structures put on stretch is restored. As regards the semicircular canals, attention is drawn to the fact that the anterior canal is one-third longer than the two others. As this third, however, is not curved in the same plane as the the other two-thirds it consequently cannot be functionally important. In other words, all three canals are equally important functionally. The anatomical structure of the ampulla is also described. This, as well as the

structure of the cupula, should be read in the original. Breuer regards the endolymph as secreted in the saccule and in the cochlea and that it passes from the saccule through the aqueduct of the vestibule into the cranial cavity.

Chapter II. Breuer has repeated the experiments with cocaine of Koenig, and comes to the conclusion that the head rotation of doves is a symptom of defect; moreover, that galvanic vertigo and galvano-tropic reaction are produced in the labyrinth ; also that Flourens's phenomena of head rotation and circular motion are also symptoms of defect.

Chapter III. Electric stimulation of the various ampullæ. The question whether it is possible to stimulate an individual ampulla electrically is still undetermined for me, notwithstanding the positive examinations of Breuer. In any case the result frequently varies, and, as Breuer himself states, it is no lecture-room experiment.

Chapter IV. Professor Hensen's objections against the static function of the labyrinth. In this chapter Breuer contradicts the objections advanced by Hensen on account of a series of facts which apparently show that a static sense must exist in the sense of Ewald. DREYFUSS.

4. These experiments are on the localization of the various tuning-fork tones in monotic and diotic sound transmission. Hearing tubes of about *1mm* in length are employed to conduct the sound in these experiments. The following points can be specially mentioned from a great multitude of interesting observations. The various tones which are transmitted to the ear frequently possess various places of localization which are located in the form of points, stripes, or planes in and about the ear. On simultaneous transmission to both ears a subjective auditory field is produced in the head which in one-sided deafness is transposed towards the better-hearing ear. Various vowels projected into the ears of the extremely deaf may produce a sensory impression rather than an auditory one, in which there is a definite position in the ear or in the head for each vowel, so that from the localization of the sensory apparatus, but without sound perception, an improvement in the hearing of the vowel is possible. BRUEHL.

5. RETHI has made about 150 experiments on dogs, rabbits, and principally on cats. Before the experiments the mucous membrane was carefully dried with cotton.

On using an induction current a distinct secretion takes place at each part of the soft palate on the location of a double electrode in its immediate vicinity. On repeated stimulation the secretion becomes less and finally was exhausted, but after a certain period of rest returned to its former amount. After injecting atropine in the soft palate no secretion could be obtained even with the strongest current.

Various nerves were investigated in order to determine which nerves produced the secretion.

Irritation of the trunk of the fifth nerve within the cranial cavity, of the lingual nerve, of the root of the glosso-pharyngeal nerve, of the spinal accessory, vagus, and hypoglossus, produced no secretion. Peripheral stimulation of the glosso-pharyngeal nerve, of the resected vagus after leaving the skull, and of the hypoglossus, also produced no effect.

After stimulating the vagus root a decided elevation of the soft palate follows. This also occurs on peripheric irritation of the pharyngeal branch of the vagus. Occasionally on the posterior smaller half on the irritated side some secretion is observed.

Central stimulation of the facial produces secretion in the velum on the irritated side and throughout its entire extent. Peripheric irritation is followed by no secretion.

On dividing the sympathetic at any level in the neck, and on irritating the proximal end, secretion promptly follows on the irritated side of the soft palate. Repeated irritation has always the same result. Mechanical irritation produced no secretion.

This experiment shows that in the secretion from the fibres of the facial and of the sympathetic we have not to deal with reflex phenomena.

True secretory fibres for the glands of the soft palate on the same side of the head are conveyed in the cervical sympathetic as well as in the trunk of the facial nerve.

In the second part the author has shown the peripheric course of the sympathetic nerve and of the secretory fibres contained in the origin of the facial nerve. These experiments were made on cats.

The secretory fibres of the sympathetic and of the facial nerve have different positions in the region of the tympanum. The sympathetic fibres enter the tympanum in the small bony channel, and those of the facial pass in the bony canal over the great superficial petrosal nerve, then they travel united to the velum

and together enter the spheno-palatine ganglion. The vaso-dilators have frequently the same course as the secretory fibres.

The fibres in the cervical sympathetic in the region below the lowest ganglion which are destined for the glands of the soft palate pass through the superior cervical ganglion, enter the tympanum together with the dilators of the pupil, pass over the promontory, and enter the spheno-palatine ganglion. In some cases the secretory fibres for the posterior parts of the soft palate enter the pharyngeal branch of the vagus, and continue their course in company with the fibres for the elevator of the soft palate.

The secretory fibres contained in the trunk of the facial nerve travel through the knee and the great superficial petrosal nerve to the ganglion, and then together with the above-mentioned in the palatine nerves to the soft palate.

Finally a few clinical observations are mentioned which are at the present time of little importance. WANNER.

GENERAL.

a.—GENERAL PATHOLOGY.

6. **Ferreri.** The relation of the sympathetic nerve to certain aural lesions. *Arch. internat. d'otol.*, etc., 1904, p. 1.

7. **Lannois.** Otitis varicellosa. *Allgem. Wiener med. Ztg.*, No. 10, 1904.

8. **Rivière** and **Thévenot.** On actinomycosis of the ear. *Revue de Chirurgie*, 1904, p. 42.

9. **Mancioli.** Tobacco: lesions of the ear, the nose, and the throat in the employees of the Royal Manufactory in Rome. *Archiv. internat. d'otol.*, etc., 1904, p. 421.

10. **Schwabach.** On the action of certain remedies on the ear. *Deutsche med. Wochenschr.*, No. 11, 1904.

11. **Spira.** Eye and ear, their similarity and varying relation. *Wiener klin. Rundschau*, Nos. 3–8, 1904.

12. **Mink.** Apparatus to diminish the sound in the examination of hearing. *La Presse oto-laryngologique Belge*, ch. 3, 1904.

13. **Gowsejew.** A new method for detecting simulated deafness. *Russkij Wratsch*, 1903, No. 49.

14. **Stein.** The clinical importance of the centrifuge for the diagnosis of certain nervous diseases. *Medicinskoje Obosrenje*, 1903, No. 17.

15. **Stein.** A dynamic goniometer. *Separatabdruck*, Moskau, 1903.

16. **Mongardi.** Three new anæsthetics for general narcosis in short operations. *Arch. internat. d'otol.*, etc., 1904, p. 425.

17. **Stein.** A new instrument (plegemeter). *Separatabdruck*, Moskau, 1903.

18. **Fränkel.** A light-weight forehead reflector. *Arch. f. Laryngol.*, vol. xiv., ch. 3.

19. **Collet.** On salpingoscopy. *Arch. internat. d'otol.*, etc., 1904, p. 25.

20. **Urbantschitsch.** A self-retaining nasal speculum. *M. f. O.*, 1903, No. 12.

21. **Glatzel.** On the examination of the permeability of the nose. *M. f. O.*, 1904, No. 1.

22. **Warnecke.** External asepsis in operations on the nose. *Arch. f. Laryngol.*, vol. xiv., ch. 3.

23. **Schleifstein.** Paraffin as a cosmetic remedy. *Arch. f. Laryngol.*, vol. xiv., ch. 3.

24. **Joseph.** Some remarks on Gersuny's article on several cosmetic operations. *Wiener med. Wochenschr.*, No. 1, 1904.

25. **Cordes.** A pharyngeal scissors. *M. f. O.*, 1904, No. 2.

26. **Litwinociwz.** A tonsillotome for the lingual tonsil. *M. f. O.*, 1904, No. 3.

27. **Engelmann.** A mouth gag. *Wiener med. Wochenschr.*, No. 1, 1904.

6. A man, forty-nine years of age, with the typical symptoms of exophthalmic goitre, suffers from continuous bilateral tinnitus, which is so annoying that the patient thought of suicide. On examining the ears, the hyperæmic tympanic mucous membrane appeared through the delicately injected drum. Two weeks after the bilateral extirpation of the superior cervical ganglion, the eyes are less prominent, the redness in the face and the swelling of the thyroid are less. The drum and the tympanic mucous membrane are less injected. The tinnitus is bearable, and the patient can again sleep at night. The hearing is improved. The author believes that in many cases of tinnitus an affection of the sympathetic nerve is present, even when no signs of exophthalmic goitre exist. OPPIKOFER.

7. LANNOIS reports two cases in which varicella produced relapses of aural affections; in addition, some caused acute suppuration, one of which required operation. He concludes as follows:

(1) Varicella exceptionally affects the ear.

(2) The varicellous symptoms in the ear are new attacks or relapses of a catarrhal otitis media, or of previously existing suppurations which arise after the onset of the pharyngeal affection.

(3) Varicella sometimes produces purulent otitis, and then may be complicated with mastoiditis. WANNER.

8. A man, thirty-six years of age, was taken ill with severe pain in the left ear; discharge after two weeks. Several days after the onset of the otorrhœa a very hard swelling appeared over the mastoid process and the left side of the neck corresponding to the upper two-thirds of the sterno-mastoid muscle. Numerous small superficial ulcers formed in this location and perforated spontaneously. At the depth of the ear canal there is a swelling, resembling a ruptured furuncle. Microscopic examination of the pus from the ear and from the abscesses revealed actinomycosis. The drums were normal, no perforation sound, mouth organs without anomaly, general condition good. The abscesses in the neck were opened. The mastoid process is normal, and is not opened. Recovery after five months. According to the author, the actinomycosis began in the external auditory canal.

OPPIKOFER.

9. In 335 cigarette girls, a chronic pharyngitis was present in 301. In all cases there was chronic rhinitis. The tobacco dust exerts a mechanical irritation on the mucous membranes; the chemical action of the nicotine is of less moment in the causation of these catarrhs. Ear disease is unusual. It can be regarded as an accidental condition. OPPIKOFER.

10. A young woman, twenty-five years of age, had used Fowler's solution for a long time, on account of a chronic eczema, and suffered from a catarrh of the mucous membranes of the nose, ears, and eyes. After all other remedies had been unsuccessfully tried, the symptoms disappeared on discontinuing the arsenic. These symptoms consisted in severe deafness, subjective noises, catarrh of the nose and of the naso-pharynx, lachrymation, and conjunctivitis.

A girl, twenty-eight years of age, became ill with fibrinous pneumonia, and took 4.5*g* salipyrin for two days on the advice of her physician. After 1.5*g* had been taken, deafness and intense tinnitus were complained of; examination with tuning-forks revealed an affection of the sound-perceiving apparatus. Thinking that salicylic acid, like quinine, caused a hyperæmia and vascular congestion, SCHWABACH prescribed ten drops of ergot three times daily, with the result that the tinnitus ceased completely and the hearing was much improved. The author, however, would only recommend this remedy at present with considerable reserve, as the recent investigations of Wittmaack

show that, at least for quinine, the disturbances in the hearing are not the result of a circulatory disturbance, but from a direct injury of the ganglion cells in the spiral ganglion. Nevertheless ergot could be tried on suitable cases, as it is not associated with any danger or unpleasantness for the patient.

NOLTENIUS.

11. The contents of this unusually extensive article are well known to the specialist, and a great amount of the collected material is not suited for a short review, but should be read in the original. WANNER.

12. MINK has constructed an apparatus by which he is able to reduce the hearing for whispering to one-fifth. It consists of an old-fashioned chloroform mask and a funnel whose small opening is covered with two layers of thin silk. BRANDT.

13. On stroking the back of the patient with his clothes on, first with the hand, then with a brush, and then simultaneously stroking his back with a hand and the arm of the physician with a brush, the really deaf will give correct answers, as he depends solely upon the sense of touch. The malingerer, on the other hand, will become confused in his answers, as he will confuse the auditory impressions with the tactile impressions, and he will not be able to tell exactly whether he feels the touch of the hand or of the brush whose noise he hears. SACHER.

14. According to the author, with the aid of the centrifuge and of the goniometer, a number of new symptoms are obtainable. This apparatus is not so important for the aurist as for the neurologist. The centrifuge may also be used for therapeutic purposes, as it exerts a great influence in general metabolism. Continuous and violent centrifuging of dogs when lying with their heads toward the periphery produced a hyperæmia of the brain. If the head was directed toward the centre, the brain became anæmic. In some patients, tinnitus disappeared under the centrifuging after a moderate rotation in a vertical direction in certain sick persons, and in healthy persons sleepiness sets in. The centrifuging acts favorably upon vertigo. SACHER.

15. The goniometer is an apparatus constructed by the author, which is to be attached to the centrifuge, by which in the various changes in direction the deviation of the head can be exactly determined. The construction and use of this instrument are illustrated by a number of pictures. SACHER.

16. The following three narcotics are recommended for short operations: Somnoform (a mixture of 60 parts of ethyl chlorid, 35 parts of methyl chlorid, and 5 parts of ethyl bromid), ethyl chlorid, and liquor somniferus (methylen and ethyl ether). These three agents are all without danger, have no unpleasant side effects, and after the narcosis sleep begins immediately. The narcosis was induced in a healthy boy of ten years. A few seconds after beginning, a severe collapse set in. In two of the remaining four cases in adults deep narcosis could not be obtained. OPPIKOFER.

17. The investigations of Curschmann, Bornhardt, Spamer, and others have shown in animals that the extremities on the same side as the affected labyrinth are weaker than those on the healthy side. The same observations have been made by Wanner in patients with diseased labyrinths. After a blow with the full hand on the shoulders, the patients would fall and were more inclined to fall to the side of the diseased labyrinth than on the other. In this method of examination it is impossible to always reproduce a blow of the same intensity, so that the results cannot well be compared. With the apparatus constructed by the author a blow can always be given with the desired force, so that the results can be compared. SACHER.

18. Description of a forehead mirror which has a metallic rim of only 1*cm* in breadth. The remaining part of the black surface is protected by a thin plate of hard rubber. A mirror with a diameter of 10*cm* weighs only 71*g*. ALBANUS.

19. COLLET recommends salpingoscopy for the careful examination of the opened maxillary cavity of the interior of the nose, and especially to examine the naso-pharynx.

OPPIKOFER.

20. This instrument consists of a nasal speculum which is attached to a spectacle frame. PIFFL.

21. The author has again taken up the idea of Zwaardemaker to determine the amount of deposition of vapor contained in the respiratory air on a cold mirror or metallic surface in order to determine the patency of the nose. He has for this purpose devised a mirror of tin which can be sterilized. The varying degree of the respiratory area and the varying length of time which it takes this area to disappear give a distinct method for determining the patency of the nose. If this examination

shows a difference, then the patient should be examined by rhinoscopy. PIFFL.

22. The author uses a thin elastic sheet of rubber in nasal operations, which hangs down over the lips and chin and is held in place behind the head. An infection of the instruments and of the dressings is thus avoided. ALBANUS.

23. In two cases of ozæna with saddle-shaped deformity of the nose, the injection was successful; the fetor of the ozæna disappeared on the simultaneous use of irrigations. In the first case, on injecting paraffin melting at 40° C., and in the second case, where hard paraffin was employed, transient swelling in the surrounding parts took place. The injected paraffin is after a time replaced partly by a compact connective-tissue, which, however, does not affect the function of the paraffin. Hard paraffin, melting at 54°, does not produce any marked irritation compared with soft paraffin at 36°, hence can be better employed. The use of paraffin for cosmetic purposes is only justified in excessive deformities and only by the wish of the patient. For curative purposes, however, it can be employed.

ALBANUS.

24. JOSEPH asserts his priority claims and recommends the wedge-shaped resection for diminishing the size of the auricle. After a number of weeks or months paraffin injections in the nose have in a certain proportion of cases been followed by a moderately intense redness of the skin as well as the presence of swellings and nodules which at first interfered greatly with the cosmetic result. Displacements of the paraffin occasionally occur. WANNER.

25. As the lateral folds of the pharynx sometimes remained hanging after attempted removal, CORDES has constructed a pair of scissors whose points are crossed. PIFFL.

26. A modification of the well-known Schuetz tonsillotome, so that its curve is adapted to the situation of the lingual tonsil. PIFFL.

27. This instrument is in the form of a pair of forceps, and can be used to open the jaws, as well as an oral speculum. WANNER.

b.—DEAFMUTISM.

28. **Mariage.** The measure and the development of hearing in deaf-mutes. *Arch. internat. d'otol.*, etc., 1904, p. 30.

29. **Coen.** On suggestive and disciplinary factors in the treatment of stuttering. *Wiener med. Wochenschr.*, No. 8, 1904.

28. The hearing of twenty-four deaf mutes was examined by a sirene which produced the vowels *a*, *e*, *i*, *o*, *u*. This same instrument was employed in order to give hearing exercises for a period of six weeks. The author concludes that the deaf-mutes not only possessed hearing remnants, but that in cases of total deafness the hearing power can be improved by exercise. The vibrations produced by this apparatus are neither painful nor fatiguing; on the contrary, the deaf-mutes on hearing them were much pleased. OPPIKOFER.

29. Individuals who stutter have a peculiar nature. In endeavoring to correct their stuttering, it is first of all necessary to overcome their retiring, diffident dispositions. For this it is necessary that they should look at the speaker with raised head. The fear for speaking must be counteracted. In addition to the local treatment there should be general treatment suited to the character and personal peculiarities of the patient.

WANNER.

EXTERNAL EAR.

30. **Juergens.** Three cases of burning of the ear with vinegar essence, and a report of the further course of a case observed a year ago, published in this periodical. *M. f. O.*, 1903, No. 12.

31. **Boehm.** On injuries of the drum membrane after indirect violence. *M. f. O.*, 1904, No. 3.

32. **Chorenshitzky.** A transverse bullet wound of the external auditory canal. *M. f. O.*, 1904, No. 1.

33. **Alt.** Foreign bodies in the middle ear. *Wiener klin. Rundschau*, No. 2, 1904.

30. The combustion of the ear took place in the three cases in soldiers who endeavored to avoid military duty. In the first case, the drum perforated with a chronic purulent otitis. In the second case, recovery took place, with a dry perforation of the drum. In the case previously reported, with a total defect in the drum, a combustion of the inner labyrinth wall, and injury of the labyrinth, after one year the labyrinth wall was covered with epidermis and the hearing was improved, though suppuration still persisted. PIFFL.

31. This is a report of three cases of rupture of the drum observed in Haug's Polyclinic in Munich. The ruptures were

the result of force acting upon the opposite side of the head, produced in two cases by a blow on the ear, and in the third by a blow on the lower jaw of the opposite side. In the two cases the drum was atrophic, in the third it was partly calcified. The author believes that in these three cases the ruptures took place by contrecoup, and discusses at length the mode of origin of ruptures of the drum. PIFFL.

32. The bullet struck the zygomatic process, was then deflected backwards and downwards, lacerating the anterior and inferior walls of the cartilaginous canal, was deflected downwards and backwards by the mastoid process, and rested finally in the skin over the 6th and 7th cervical vertebræ. The middle ear was not injured. The wound was healed with stenosis of the auditory canal. PIFFL.

33. The methods of treating foreign bodies are briefly reviewed. Two cases are reported in which unsuccessful attempts to extricate foreign bodies led to displacing the foreign body into the tympanum, and an operation was required, consisting in the detaching of the auricle and resection of the posterior canal wall. WANNER.

MIDDLE EAR.

a.—ACUTE OTITIS.

34. **Veis.** The prophylaxis of acute otitis media. *M. f. O.*, 1904, No. 2.

35. **Wojatschek.** On the function of the auditory canal in acute diseases of the middle ear and its adnexa. *Dissertation*, St. Petersburg, 1903.

36. **Gerber.** On labyrinth necrosis. *A. f. O.*, vol. lx., p. 16.

34. In order to prevent the otitis following attempts to blow the nose, the author recommends that the nose should be blown with both sides of the nose kept perfectly free. The suggestion is unquestionably in order, though it does seem doubtful if by this means most purulent catarrhal inflammations of the middle ear can be avoided. PIFFL.

35. After examining twenty-seven patients, the author states that in acute diseases of the middle ear, air-conduction for all sources of sound is diminished. During convalescence, hearing for whisper is more quickly recovered than for the tuning-fork. Hearing sinks almost uniformly throughout the entire tone series. Bone-conduction is frequently increased. Immediately after closure of the wound of the drum the hearing is improved.

SACHER.

36. A report of a case of total labyrinth necrosis which was operated upon. The patient was a girl, twelve years of age, suffering from a purulent otitis after scarlet fever eight years ago. A very early onset of the facial paralysis with complete absence of disturbance of co-ordination is noticeable, also the occasional pyæmic character of the temperature in a not thrombosed sinus, as well as a rapid pulse persisting to convalescence. The cases of labyrinth necrosis which were collected in 1898 by Pesch are augmented by 12 additional cases by the author. A statistical study of these 90 cases then follows, with especial regard to the course, the cause, situation, extent, symptoms, and termination. HAENEL.

b.—CHRONIC PURULENT OTITIS.

37. **Schulze.** Investigations on caries of the ossicles. *A. f. O.*, vol. lx., p. 252.

38. **Klug.** On hemorrhage from internal carotid artery, following caries of the temporal bone. *Jahrbuch für Kinderheilkunde*, N. F., lv., H. 4.

39. **Schulte.** Aneurism of the carotid artery in the middle ear. *M. f. O.*, 1904, No. 3.

40. **Politzer.** On intra-auricular transplantation of Thiersch grafts after the radical operation. *Wiener klin. Wochenschr.*, No. 12, 1904.

37. The material examined consisted of 22 hammers and 17 anvils, which were removed from 10 cases of cholesteatoma and 14 cases of caries, and was examined histologically, with the following results: Almost all of the ossicles showed the typical picture of lacunar bone absorption, which was present in various forms. Under caries are counted, in addition to the cases with rough superficial surfaces bared of the soft parts, the cases where the bone was undergoing destruction underneath infiltrated or thickened periosteum occasionally covered with an intact mucous membrane or a cholesteatomatous matrix. Contrary to the views of Brieger and Goerke, the preceding disease of the periosteum and the secondary extension of the process to the bone is always the rule. The chief cause of the disease of the bone is a local disturbance of nutrition, though there may be an associated anomaly of nutrition, as scrofula (tuberculosis). The local causes consist in retention and fermentation of pus, as Scheibe has shown. The author does not think that the presence of cholesteatoma is the main factor in pus retention and fetor.

The results of these examinations have shown SCHULZE that the recent more conservative treatment of caries of the ossicles

is not justified, though a recovery from carious disease of the ossicles can take place without operation, and attempts with irrigation through the tube, etc., may be indicated in certain cases. In cases of isolated caries of the ossicles, the extraction of the hammer and anvil should be undertaken. If the otoscopic examination cannot exclude bone disease in the antrum and the aditus with probability, the radical operation should be undertaken. He reviews the various objections advanced against the extraction of the ossicles, especially the view that an isolated caries of the ossicles does not exist, and that the removal of the ossicles interferes with the hearing. He is not able to find any reason why the ossicles should be retained in the interests of hearing, and is especially opposed to the method of radical operation which has recently been suggested by Siebenmann, where the tympanic margin and the ossicles are preserved. This is followed by a very much more obstinate and painful after-treatment, and incurs the danger of relapse of cholesteatoma.

HAENEL.

38. A tuberculous child four years of age suffered from a left-sided purulent otitis. At operation, two large sequestra, which included almost the entire petrous bone, were removed. Twenty-two days after the operation on changing the dressing immediately after removing the tampon a very profuse bright-red hemorrhage took place, which ceased upon tight packing the depth of the wound. Death occurred three days later, though the hemorrhage did not recur.

At autopsy, pulmonary tuberculosis and circumscribed purulent meningitis were found.

In the depth of the wound the carotid was found exposed at the convex side of the bend. In the region where it changes from a vertical to a horizontal course an opening was found in the wall of the vessel.

The success of the packing in arresting the hemorrhage was due to the pad directly compressing the vessel in the depth of the wound.

HOELSCHER.

39. A woman, twenty-six years of age, had a left-sided chronic purulent otitis with large perforations through which a round tumor with smooth surface protruded, which was at first taken for a polyp, then for a purulent cyst and incised. Immediately a stream of bright-red blood issued forth, which ceased upon

packing. Three days later, a very severe hemorrhage took place, which could not be controlled by packing. The left common carotid was ligated without causing any disturbance of cerebral function. In the subsequent days repeated hemorrhages occurred, which did not cease until injections of gelatin, repeated every two or three days, were made. The tumor is regarded as an aneurism of the internal carotid, protruding into the tympanum through a dehiscence of the bone.

PIFFL.

40. The various methods of forming flaps from the auditory canal and of transplantation are discussed. Recently in the author's clinic the Panse meatoplasty was performed and the wound behind the ear was immediately closed after the operation.

The transplantation was practised in cases where a Panse or a Koerner meatoplasty had been made, and after an interval of six to twenty days, as soon as the surface of the wound was covered with a layer of granulations. Previous to the transplantation, the ear is irrigated with sterilized water, then filled with 6 % hydrogen peroxid. The wound is dryed out with cotton and tamponed. Then in three to four hours the operation of transplantation takes place. A skin flap is removed from the thigh or the forearm, measuring 1–2*cm* in size. These grafts are placed upon a glass canula which is perforated with a number of openings. The end of the canula is in connection with a blowing apparatus. The canula is introduced opposite the ear to be covered by a graft, and the graft is blown upon the wound surface; then packing with small pledgets of cotton. The apparatus is illustrated.

In 12 cases which were treated by this method, the wound was entirely dry at the first change of dressing in 5; the grafts had taken. In 5, the region of the tube showed some discharge and the grafts had not taken. In 3 of these cases epidermization followed the use of chromic acid, and in 2 there was no result.

WANNER.

c.—CEREBRAL COMPLICATIONS.

41. **Milligan.** A short note upon a preliminary step in the operative treatment of cerebellar abscess. *Journal of Laryngology*, June, 1904.

42. **Horder.** A case of bacillus pyocyaneus pyæmia following ear disease. *Lancet*, April 23, 1904.

43. **Emery.** A new pathogenic bacterium causing basal meningitis in infants. *Lancet*, Aug. 27, 1904.

44. **Knaggs.** A case of abscess of the temporo-sphenoidal lobe presenting symptoms of "amnesic aphasia"; operation; recovery. *Lancet*, Sept. 19, 1903.

45. **Wolferz.** A case of otitic cerebral abscess. *St. Petersburger med. Wochenschr.*, 1904, No. 1.

46. **Haike.** Tuberculous meningitis after acute purulent otitis media in one case complicated with chronic internal hydrocephalus. *Jahrb. f. Kinderheilk.*, 58, 4.

47. **Hoelscher.** Otitic diseases of the meninges. I. Diseases on the external surface of the dura mater. *Bresgens Sammlung VII.*, 6, 7, herausgegeben von Dr. Heermann in Keil.

48. **Kobrak.** On the pathology of otitic pyæmia. *A. f. O.*, vol. 60, p. 1.

49. **Streit.** A cured case of severe otitic sinus thrombosis with meningeal symptoms. Exposure of the jugular bulb. *Deutsche med. Wochenschr.*, No. 6, 1903.

50. **Panse.** On the technique of exposing the jugular bulb. *A. f. O.*, vol. 60, p. 33.

41. MILLIGAN suggests that, before an operation for cerebellar abscess is undertaken, lumbar puncture and the withdrawal of a varying amount of cerebro-spinal fluid should be performed, in order to diminish the risk of failure of respiration from paralysis of the respiratory centre due to pressure.

ARTHUR CHEATLE.

42. After death green pus was found in both middle ears, in several abscesses in the lungs, and in a large abscess of the spinal meninges. From this pus the bacillus was grown in pure culture.

ARTHUR CHEATLE.

43. EMERY relates three cases of basal meningitis in which he discovered a new pathogenic bacterium in the meninges and in the middle ear. He thinks the ears were secondarily affected. He reserves a full account of the organism until its character has been fully investigated. ARTHUR CHEATLE.

44. The abscess, which was on the left side, was found to be draining into the antrum. From three to five ounces of pus escaped on opening. The difficulty with words disappeared a few days after the operation. ARTHUR CHEATLE.

45. A boy, three years of age, suffered from scarlet fever with an otorrhœa on the left side. In the fourth week the suppuration became profuse with rise of temperature; the middle-ear cavities were opened. Pus was observed to escape from a fistula in the roof of the tympanum. An abscess as large as a hen's

egg in the left temporal lobe was then exposed and evacuated. The abscess cavity was closed on the ninth day. After the twelfth day the temperature was normal. The post-aural plastic step was performed five weeks later. Recovery after seven weeks. There were no symptoms except changes in the eye-grounds. SACHER.

46. Report of the case-histories of two children in whom a tuberculous meningitis developed immediately after an acute otitis. The author regards the otitis as the inciting factor in the causation of the tuberculous meningitis. BRUEHL.

47. A picture of otitic diseases of the meninges is given, based on a large number of personal observations and from literature. The statistics, the anatomical relationships, the passages of extension, the external pachymeningitis, and extradural abscesses are discussed. These clinical pictures are illustrated with carefully reported case-histories. BRUEHL.

48. Two cases of otitic pyæmia are reported, one with, the other without, sinus thrombosis. The former is interesting on account of the presence of a peribulbar abscess in the vascular sheath of the jugular vein, with the formation of a parietal thrombus in the jugular vein, which showed a distinct tendency to organization. In both cases, by means of agglutination, it was shown that a proteus cultivated from the pus from the ear was the cause for the general infection, and the otitic origin of the pyæmia was assured. This organism has always been regarded as a harmless saprophyte. The author is the first to draw attention to the importance of agglutination to demonstrate the otitic infection. HAENEL.

49. Relapsing otitis media, opening of the mastoid process, profuse venous hemorrhage, apparently from a large mastoid vein. Then meningeal symptoms, pyæmic temperature curve. Eight days after the first operation lumbar puncture was negative, and the jugular vein was ligated and the sinus exposed. The sigmoid sinus was empty, closed at both extremities by a thrombus. At the entrance of the mastoid vein there was a circular opening in the sinus. The pyæmic temperature continued. Six days later the jugular bulb was exposed after the method of Grunert. Then the temperature gradually dropped for three days, then another pyæmic attack, followed by convalescence. The facial nerve was at first slightly paretic, later normal. STREIT

is of opinion that the facial nerve cannot always be protected in peculiarly unfavorable anatomic conditions. If unfavorable conditions are present, it is necessary to leave the external margin of the jugular foramen. Even then the jugular bulb is sufficiently exposed. HAENEL.

50. After experiments on the cadaver, PANSE suggests, in order to avoid injury to the facial in exposing the jugular bulb, that the facial nerve be first exposed in its vertical course and then displaced out of its canal. HAENEL.

d.—OTHER MIDDLE-EAR DISEASES.

51. **Connal.** The treatment of dulness of hearing and subjective noises in the ears by high-frequency currents. *Journ. of Laryngol.*, Aug., 1904.

52. **Mackenzie.** A case of deafness, following on nasal obstruction without other disease of the hearing apparatus. *Journ. of Laryngol.*, June, 1904.

53. **Watson.** Pathogenesis of deafness due to chronic non-suppurative middle-ear disease. *Lancet*, Jan. 9, 1904.

54. **Turner.** A case of extensive osteo-myelitis of the temporal bone not involving the middle ear. *Lancet*, Jan. 2, 1904, Edinburgh Medico-Chir. Society.

55. **Stroem.** On a supramastoid cranial pneumatocele. *Nord. med. Arkiv*, 1902, I. Abt., H. 2, No. 8.

56. **Stern.** Immobility of the stapes in the oval window. Wiesbaden, bei Bergmann, 1903.

57. **Habermann.** On the pathology of the so-called otosclerosis. *A. f. O.*, vol. lx., p. 37.

58. **Royer.** Adhesions of the Eustachian tube to the posterior pharyngeal wall as a cause for progressive sclerosing otitis and symptoms of vertigo. *Arch. internat. d'otol.*, 1904, p. 371.

59. **Stefanowski.** Myringotomy as a means of improving the hearing in chronic aural catarrh. *Wratschebnaja Gaseta*, 1904, No. 8, p. 9.

51. In all the cases described, ordinary treatment had been tried and found ineffectual. Dr. Riddell carried out the electrical treatment; he found that the effleuve method was unsatisfactory so he placed a condenser electrode in each ear. Results:

(1) Six chronic dry catarrh with secondary labyrinthine involvement. No improvement in any, but two thought the tinnitus was less.

(2) Fourteen chronic dry catarrh. Ten with tinnitus, which was much better in two and improved in eight.

Two in which a fractional improvement in hearing was noted.

(3) Seven post-suppurative condition.

Five with tinnitus, which was much better in four. In four there was a fractional improvement in hearing.

(4) Five sclerosis. In all, improvement in hearing, but slight in one; tinnitus improved in all.

In all groups the greatest benefit was obtained in the subjective noises. Apart from types, seventeen out of twenty-six complaining of tinnitus were improved. ARTHUR CHEATLE.

52. A man, aged twenty-four, attended for deafness. Five months previously his nose had been cauterized elsewhere because he had difficulty of breathing through it on cold. After this treatment the obstruction became almost complete and he became very deaf, the hearing having been normal previously.

On examination both passages were closed by adhesion of the external walls to the septum. The drums were somewhat indrawn. The fauces, pharynx, and naso-pharynx were healthy. After removal of the nasal obstruction the hearing returned.

ARTHUR CHEATLE.

53. WATSON thinks that a closer and more systematic study of cases of deafness due to chronic, non-suppurative middle-ear disease, will lead to a reversal of the opinion generally held as to the absence of clinical indication of catarrh in the group of cases variously described as sclerosis of the middle ear, atrophic catarrh, otosclerosis, etc.

ARTHUR CHEATLE.

In two hundred cases of the disease, he has not seen a single instance where there has not been either (1) a clear history of frequently recurring "colds in the head," of a slight or severe nature, or (2) in those patients who definitely stated that they were not subject to colds, unequivocal evidence of an intercurrent naso-pharyngeal catarrh. He thinks that the condition found in the various forms of chronic non-suppurative middle-ear disease are different stages of one disease. He has examined three cases of deafness in dogs, using two in which the hearing was normal, as controls.

The Eustachian tubes of the deaf dogs showed distinct evidence of catarrh, the tympanic membranes were more opaque than normal, the mobility of the membrane and ossicles was impaired, the density of the temporal bone was increased, and the lining membrane of the tympanic bulla was extensively congested and thickened. A histological examination of the tympanic mucous membrane and of the lining membrane of the

bulla showed marked thickening (sclerosis) with increased vascularity. He thinks that it is conceivable that the chronic forms of inflammation may be induced by the attenuated activity of organisms which cause acute otitis media. CHEATLE.

54. TURNER showed a girl, aged twelve, who had never had middle-ear disease, and in whom the membrane was intact and the hearing normal. A gradually increasing swelling formed behind the right ear, the bone felt distended, and the skin became discolored. On incising the skin, extensive disease of the mastoid region was found extending to the lower part of the squamous portion and the occipital bone. The osseous tissue was full of pus and granulation tissue.

No evidence of tubercle, but pneumococci were found in the sputum. CHEATLE.

55. A young man, nineteen years of age, had otitis when he was eleven, which was not treated. This was followed by no symptoms except some deafness. For a half-year there has been a gradually increasing swelling over the left ear, involving the greater part of the temporal region and the mastoid process, in the centre with the consistence of an air cushion, hard at the edges. Beyond the ear, it is possible to feel through the firm bony wall a broad fissure *1cm* wide, with irregular toothed margins. The swelling is not tender. On deep pressure, tinnitus is produced. Tympanic percussion note. The swelling cannot be diminished by pressure, and is not influenced by Valsalva's experiment or by the catheter. The drum is normal, hearing good. At operation, a bone lamella, as thin as paper, was found connected with the surface of the skull by peculiar stalactite-like formation, $\frac{1}{2}$ to *1cm* high. In the fissure, these peculiar structures do not quite approach the bony lamella and form slight prominences. A true fissure is not present. The lamella is extirpated. The bone in the mastoid process is distended and contains large pneumatic spaces, which communicate with one another. There is no direct communication with the tympanum. Recovery without event. No relapse after two years.

MOELLER.

56. The causes of stapes-ankylosis may be subdivided as follows:

A. Primary diseases leading to ankylosis of the stapes (ankylosis vera):

(1) Sclerotic catarrh of the tympanic mucous membrane.

(2) Circumscribed periostitis about the stapes.

(3) Primary diseases of the bony labyrinth capsule, "otosclerosis," "capsulitis," and "spongiositis" of the labyrinth capsule.

(4) Primary calcification or ossification of the annular ligament.

(5) Primary hypertrophy of the cartilaginous covering of the stapes plate, or of the margin of the niche.

(6) General hyperostosis of the temporal bone, with obstruction of the plate or the branches of the stapes by the surrounding osseous proliferation.

B. Secondary ankylosis of the stapes, following secretory middle-ear catarrhs:

(1) Through thickening of the mucous membrane or of the periosteum in the niche of the oval window.

(2) By connective-tissue strands and bands, partly the remnants of fœtal conditions.

C. Temporary fixation of the stapes from excessive retraction of the drum in occlusion of the tube.

After an examination of the material in Bloch's clinic, the author concludes that stapes ankylosis is frequently a secondary symptom of a previous disease of the labyrinth capsule, and that the disease is generally bilateral. Of great importance for diagnosis is Gellé's experiment, the value of which has not been sufficiently appreciated. HOELSCHER.

57. An extensive and illustrated report of the results of examination in twelve temporal bones from seven patients. The disease consists in an osteitis of the labyrinth capsule, occurring between the twentieth and the fortieth year. It increases usually in the form of two or three isolated foci from the periosteum along the blood-vessels into the bone. In the depth of the bone the process extends, while there are but slight changes in the surface of the bone. Usually the area surrounding the oval as well as the round window is affected. In the subsequent course the window membranes as well as the stapes may be infected. The membranous labyrinth usually remains intact. The endosteum may be thickened or calcified. All stages of the osteitis may be encountered side by side: absorption of bone with development of vessels, retrogression of vessels, new formation of bone, which, however, can always be distinguished easily from the normal bone. HABERMANN regards the sclerosis as a specifi-

cally syphilitic disease, and for the following reasons: It frequently occurs in persons affected with syphilis; it appears at a time when syphilis is frequently acquired; the similarity of the histological condition with syphilitic processes in bone; the symptoms—deafness, subjective noises, and vertigo—depend upon the site of the morbid areas; obstruction of the niches and stapes-ankylosis can be produced by catarrhal inflammations of the tube and of the tympanum, also by certain middle-ear diseases which do not lead to a perforation of the drum. These forms must be separated from the true sclerosis, both on pathologic grounds as well as from the course of the disease. The treatment of syphilitic sclerosis must be an anti-syphilitic one; mechanical methods of treatment to counteract rigidity of the sound-conducting apparatus should be tried. HAENEL.

58. According to ROYER, the cause for progressive deafness consists in broad adhesions of the pharyngeal opening of the Eustachian tube to the posterior pharyngeal wall. After division of these adhesions with the finger, the author believes that he has observed cases of recovery, improvement, or at least stationary deafness. OPPIKOFER.

59. The author comes to the following conclusions on sixteen cases: 1. Myringotomy is easily performed without pain and without danger. It should, therefore, be frequently undertaken to improve hearing and diminish tinnitus. 2. In 62.5 %, myringotomy improved the hearing, in 12.5 % of these almost complete recovery. 3. In all cases the noises were diminished or relieved. 4. The operation had a similar effect on the vertigo; the attacks were less frequent and less intense; vomiting and nausea disappeared. 5. The result is quicker the earlier the operation is undertaken. 6. In all cases the operation was easily performed without unpleasant incidents or complications. 7. The opening did not close in any case. SACHER.

NERVOUS APPARATUS.

60. **Lake.** Removal of the semicircular canals in a case of unilateral aural vertigo. *The Lancet*, June 4, 1904.

61. **Wallace** and **Mariage.** A case of attempted division of the eighth nerve within the skull for the relief of tinnitus. *The Lancet*, April 30, 1904.

62. **Fuchs.** A case of so-called idiopathic chronic internal hydrocephalus (in an adult); a contribution to the study of objective tinnitus. (Arbeiten aus dem Institut für Anatomie und Physiologie des Zentralnervensystems an der Wiener Universität.)

63. **Urbantschitsch.** On disturbances of writing and speaking as well as paralysis of the upper and lower extremities originating in the sensory nerves of the head. *D. Z. f. Nervenheilk.*, xxvi.

64. **Okouneff.** Involuntary movements of the head as the expression of an isolated affection of one of the semicircular canals in man. *Archiv internat. d'otol.*, etc., 1904, p. 345.

60. A highly important and interesting case is related by LAKE. A woman, aged twenty-one years, has been the subject of vertigo, vomiting, and gradually increasing deafness and tinnitus for five years. Ordinary treatment was of no avail. On February 16, 1904, the ordinary radical operation was performed with the exception that the innermost portion of the "bridge" was not removed, but the bony opening in the temporal bone was enlarged forwards, upwards, and backwards. The malleus and incus were removed. The semicircular canals were cut away with the burr. For forty-eight hours after, the patient lay coiled up on the right side, with the thighs flexed on the abdomen and the legs on the thighs. The eyes were closed, but on raising the lids, the eyeballs were seen to move in irregular rhythmical movements upwards and downwards and laterally. On the seventh day she sat up; on the tenth she was able to walk with assistance for a few steps, and after four weeks she was able to do anything without fear of falling to the right side whenever she turned to the left. At the end of fourteen weeks there had been no return of vertigo, but the tinnitus was just the same as before the operation. The hearing power was markedly increased. The voice, which had only been heard before at a distance of two feet, was well heard at five feet. The tuning-fork tests before and after are given. ARTHUR CHEATLE.

61. A female, aged twenty-three, having had several operations for chronic suppuration of the left middle-ear developed giddiness and tinnitus one year after healing had occurred. The tinnitus was entirely confined to the left side and resembled the rushing of water or the sound of bells, being worse at night, especially if she lay on the left side. The tinnitus prevented sleep, and even with hypnotics the sleep was disturbed. When giddy, the ground seemed to rise towards her face. Her general condition became so bad that, as every treatment failed to give relief, Mr. WALLACE decided to divide the auditory nerve as it entered the internal auditory meatus. On September 3, 1903, the old wound was opened up and a horizontal incision backward was

made for one inch at its centre. The previous removal of bone rendered much more removal unnecessary; however, in removing bone at the lower part free bleeding occurred, which necessitated plugging and the postponement of further operation.

On September 10th, the sinus was found full of clot and projected so far forwards that it was divided between ligatures.

The anterior border of the exposed dura mater was incised in a somewhat curved manner for about one inch. A flat bent retractor was then introduced and an attempt made to expose the nerve by slowly pressing the cerebellum backwards. The continual flow of cerebro-spinal fluid and the free bleeding from the surface of the cerebellum hindered proceedings. After much difficulty a view of the nerve was obtained, and by means of a blunt hook the auditory nerve was pushed aside and the facial exposed. The hook was then turned through a right angle and passed behind the auditory nerve which by traction was divided. On September 11th, there was no facial paralysis and the tinnitus had greatly subsided. There was considerable giddiness on raising the head, and headache, with flow of cerebro-spinal fluid. Death occurred on October 1st, twenty-one days after the division of the nerve. At the post-mortem there was no sign of meningitis. The auditory nerve was found divided with the exception of a strand as thick as a fine piece of cotton and lying next the facial nerve. The lower half of the pons Varolii and the entire medulla oblongata was examined by Farquhar Buzzard. His report is too long for insertion here, but the vestibular nerve was found completely degenerated and about two-thirds of the cochlear. ARTHUR CHEATLE.

62. The patient, a woman, thirty years of age, suffered at least three years from headache which at times became so severe that she became almost insane. These severe attacks, however, never lasted long, and the patient was able to follow her calling of delivering newspapers with brief interruptions. Tinnitus existed for three years. This was so severe that the relatives of the patient could perceive it. The noise in the head developed suddenly overnight. On examination December 12, 1902, there was a slight thyroid tumor, moderate exophthalmos, and bilateral choked disk.

Ear.—Drumheads both normal; tuning-fork perception for air moderately diminished, for bone normal; Weber uncertain, Rinne positive on both sides. Whisper was heard at $4\frac{1}{2}m$.

The skull showed no abnormality. On auscultating the skull, in all places a distinct pulsating, blowing noise could be heard continuously, appearing loudest in the proximity of the right ear and in the right auditory canal. On pressing the right carotid artery, the noise ceases, to return on relaxing the pressure. During compression, the hearing for whisper increased up to 8*m*, and the tuning-fork could be heard longer than before.

Diagnosis.—Endocranial aneurism of the right internal carotid in or near its canal.

The condition of the patient remained about the same up to June, 1903, then she became worse. The sight in the right eye failed first, then occasional vertigo, and since the beginning of July during the attacks she vomited. From July 10th incontinence of urine and fæces, increase of the head noises, especially in the right ear, severe occipital headache. The patient usually rested on her right side.

She was admitted to the clinic, July 25, 1903. On further examination, there was no ocular paralysis. The disks were well-defined, no paralysis, no convulsions, no fever. The noise can be heard on approaching the ear within 1–2*mm* from the right temple. It can no longer be controlled by compression of the carotid.

She was somewhat relieved by morphin and ice, then suddenly at night while talking to her neighbor death ensued.

Autopsy.—Chronic internal hydrocephalus with granulations on the ependyma and chronic cerebral œdema. The cerebral convolutions were flattened. The plexus of the fourth ventricle was thickened and adherent. Chronic pulmonary tuberculosis at the left apex, œdema of the lungs, hyperæmia of the liver and of the kidneys.

Microscopic examination showed in the parietal region of the brain a distinct round-celled infiltration of the periosteum. This extended along the blood-vessels deep into the cortex, which was unusually hyperæmic. In several areas the plexus also presented a round-celled infiltration. Otherwise even the left labyrinth was normal. There was no thickening of the carotid in the carotid canal.

The case was consequently one of leptomeningitis for which neither the cause nor clinical evidence could be furnished.

In discussing the cases of a noise which could be controlled by compressing the carotid artery, and where the diagnosis was made of an endocranial aneurism, without autopsy, the author

believes that in a number of similar cases cerebral symptoms were present. Choked disk is not in favor of the diagnosis of aneurism.

A definite explanation for the noise and its localization in the aural region is not possible. Perhaps the cause was a general one, a diffuse stenosis of the vessels. The noise could then have been produced by the compression of the vessels by the brain.

HOELSCHER.

63. The author discusses reflex paralyses of the upper and lower extremities of otitic origin (transient paresis in tubal catarrh, packing after the radical operation), the disturbances of writing produced reflexly from the ear (poor writing after the onset of ear disease occurring in fifty patients after packing of the ear and alteration of writing in eleven), then the reflex paresis of the muscles of articulation and the consecutive disturbance of speech (the difficult speech during the middle-ear catarrh, packing of the auditory canal, amnesic aphasia in middle-ear inflammation). The paper concludes with a description of the combined appearance of various reflex paralyses in ear diseases, and the influence of packing introduced into the ear has on sensations of taste and temperature, and finally asthenopia in ear diseases.

BRUEHL.

64. CASE 1.—The case of a man with left-sided otorrhœa existing since childhood. On admission, severe left-sided headache, rise of temperature to 38.5° C., profuse otorrhœa, swelling, and redness of the skin over the left mastoid process. After a few days, continuous rhythmic movements of the head in a direction from behind forwards and from right to left. On affixing the finger of the physician the movement of the head continued, and vertigo and a tendency to fall forward set in. The diagnosis was made of a one-sided disease of the semicircular canal, and curiously enough a conservative treatment was adopted consisting in irrigation, warm compresses, leeches, instillations of iodid of potash and calomel. Notwithstanding, recovery after six weeks.

CASE 2.—This is also supposed to be a case of isolated disease of the semicircular canal. From the case-history it is not quite clear whether the movements of the trunk and of the head, which have existed for two years, are the symptoms of a general affection. The fact that the patient was deaf in both ears and that after the application of a blister on the mastoid process the trembling movements of the head were reduced from 120 to 40 does

not suffice to establish the connection between the tremor of the head and of the trunk with the disease of the semicircular canal. In addition, the drum membranes were normal, and bromid, arsenic, and iodid of potash were administered.

OPPIKOFER.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY.

65. **Réthi.** So-called nasal reflexes. *M. f. O.*, 1904, No. 1.

66. **Bukofzer.** On the nasal reflex neurosis of the fifth nerve and a substitute for the diagnostic experiment with cocaine. *Arch. f. Laryngol.*, vol. xiv., No. 3.

67. **Belogolowow.** On the influence of impeded nasal respiration on the morphology of the blood and the processes of oxidation. *Dissertation*, St. Petersburg, 1903.

68. **Gellé.** On the nasal cause for lachrymation. *Arch. internat. d'otol.*, etc., 1904, p. 8.

65. After a lecture of Urbantschitsch's on paralyses of the upper and lower extremities and disturbances of writing and speaking after disease of the middle ear, the author reports on three cases in which packing introduced into the nose in one case produced a paresis of the right leg, and in two cases attacks of vertigo, which symptoms all disappeared after the removal of the tampon. Opposed to Urbantschitsch's view that these are reflexes, the author suggests the possibility that disturbances of the circulation and obstructed flow of blood and lymph from the cranial cavity may be the cause for these symptoms.

PIFFL.

66. A woman, forty-five years of age, had suffered from pain in the head for two years, then pain in the right side of the face radiating to the right ear, with attacks of deafness. The ear was examined and showed a moderate loss of hearing. The mouth could only be opened a few *mm.* Pressure on the supra-orbital foramen and canine fossa was painful. The nose presented a spur on the right side which was not in contact with the lower turbinal. The ankylosis of the jaw was probably due to muscular spasm, showing involvement of the motor sphere of the third branch of the fifth nerve, which also accounts for the increased deafness (contraction of the tensor tympani muscle). On touching the spur no symptoms resulted, but on applying an adrenaline solution the pain disappeared and the mouth could be opened.

This shows that the cocaine experiment can be replaced by the adrenaline solution. After removal of the spur the pain in the face and in the ear disappeared, mastication was again possible. A small mycotic plug was situated in the right tonsil. After removing this the sensation of a foreign body was relieved. According to the author, the spur was the primary and the plug the accidental cause for the trigeminal neurosis. Another case was then mentioned in which the restraining action of adrenaline was clearly marked. A convulsive tic in a girl fourteen years of age ceased after painting the nasal mucosa with a solution of adrenaline 1:2000. ALBANUS.

67. The question was approached by examining patients with various diseases of the nose which impeded respiration, and animals in which fluid vaseline had been injected into the nose, which on becoming cold made nasal respiration impossible. In animals this produced emphysema of the upper parts of the lungs, the oxidative power was diminished one half, and venous stasis was produced. In man the hæmoglobin of the blood was lowered five to ten per cent., and the number of red blood corpuscles diminished, and the leucocytes of medium grade developed; the evolution of the white blood corpuscles was retarded, the eosinophyles not increased. All these symptoms were especially marked in young individuals, varying in age from five to sixteen, and appeared in proportion to the duration and intensity of the nasal obstruction. SACHER.

68. One hundred patients suffering from lachrymation were examined rhinoscopically. In fifty the nose was normal; in the other fifty pathological changes were present (hypertrophic rhinitis in nineteen). According to the author, epiphora is exceptionally the result of a simple mechanical obstruction of the nasal orifice of the lachrymal duct. It is much more apt to be an infection extending from the nose to the lachrymal canal and lachrymal sac. This would explain why in not one of the nineteen cases of hypertrophic rhinitis the epiphora was cured after the nasal condition was corrected. OPPIKOFER.

b.—SEPTUM.

69. **Kretschmann.** On deviation of the anterior half of the nasal septum. *Arch. f. Laryngol.*, vol. xiv., No. 3.

70. **Félix.** Perforations of the nasal septum in syphilis. *La semaine médicale*, 1904, p. 41.

69. The nasal alæ are drawn up and out by muscular action, the resiliency of the cartilage brings them back not quite into position. Instead of subdivisions into a mobile and cutaneous septum, the author recommends the subdivision into an anterior or triangular septum, a middle or quadrilateral or cartilaginous septum, and a posterior or bony septum. Displacement of the quadrilateral cartilage out of the median line leads to a dislocation of the margin of the cartilage in the incisive sulcus, which may exist alone or be associated with a rotation of the quadrilateral cartilage on its vertical axis when the opposite side often presents a spur.

Dislocations of the quadrilateral cartilage produce changes in the position of the tip of the nose and of the dorsum. A dislocation can be aggravated through attraction from the inspiratory current. Dislocations which are not fixed can be corrected and retained in the corrected position by rubber tubes. This will result in recovery. This manœuvre is especially suited for children and youthful individuals. In adults the treatment fails on account of the impossibility of reposition.

ALBANUS.

70. FÉLIX examined 43 persons suffering from tertiary syphilis. In 6 there was a perforation in the nasal septum. In 12 patients with tertiary syphilis of the upper respiratory passages this condition was present in 7. The perforation of the nasal septum consequently can be regarded as occurring frequently in tertiary syphilis. The author, however, warns us from regarding all perforations of the septum as syphilitic, and recites all the other well-known causes that can produce a perforation. OPPIKOFER.

c.—OZÆNA.

71. **Roques.** The treatment of ozæna with collargöl. *Arch. internat. d'otol.*, etc., 1904, p. 130.

72. **Fliess.** The treatment of ozæna with injections of hard paraffin. *Berl. klin. Wochenschr.*, 1904, No. 10.

71. Four cases are reported to show the curative effects of insufflations of collargol 0.4, milk sugar 10. After irrigating and cleansing the nose, the powder is insufflated twice a day for the first ten days and then only once a day. OPPIKOFER.

72. A short report of 12 cases in which 32 injections were made in the lower turbinal and in the nasal septum. In all cases

this treatment resulted in an improvement greater than that resulting from any other previously tried method of treatment.

MUELLER.

d.—TUMORS.

73. **Kaiser.** The treatment of malignant tumors with secondary rays. *Wiener klin. Rundschau*, No. 12, 1904.

74. **Hajek.** On relapses of nasal polypi. *Arch. f. Laryngol.*, vol. xiv., No. 38.

73. The author first describes the secondary rays and the proof of their existence and shows that it is possible with secondary rays to make very much longer exposures than with the direct X-rays.

The apparatus consists of a metallic funnel. At one end there is a rubber tube which furnishes the secondary rays and which is introduced directly into the bodily cavity. As a proof of the action of secondary rays, a case is reported which had been previously operated upon four times; in an interval of three months continuous relapses with complete occlusion of the nose with tumor masses and spindle-celled sarcoma. After the operation the area was treated for from 15 to 45 minutes. As there was no inflammatory reaction, the period of treatment was prolonged to two hours. Recovery. WANNER.

74. A cause for the recurrence of polypi may be found in the polypoid degeneration of the lining of the accessory cavities. This is the opinion of the author after having observed a case of one-sided nasal polypi where after thorough removal of the polypi a sudden relapse always occurred, arising first in the ethmoid and then in the maxillary antrum. In both of these cavities, operation revealed polypi and degeneration of the mucous membrane without empyema. Recovery took place. It was unusual to note the absence of inflammatory changes in the nasal covering of the ethmoid and the transformation of the entire labyrinth into one cavity without previous suppuration. The perforation of the polypi from the maxillary antrum into the nose is explained by increased pressure within the maxillary antrum from inflammatory changes with increase of discharge.

ALBANUS.

e.—DISEASES OF THE ACCESSORY CAVITIES.

75. **Roth.** On a previously not reported form of exudate in inflammation of the maxillary antrum. *Wiener med. Presse*, No. 3, 1904.

76. **Strubell.** On the statistics of diseases of the accessory cavities. *Arch. f. Laryngol.*, vol. xiv., No. 3.

77. **Stein.** On opening into the maxillary sinus. *Chirurgija*, Oct., 1903.

78. **Cumston.** Some remarks on dentigerous cysts. *Revue de Chirurgie*, 1904, p. 31.

79. **Lasarew.** On ethmoidal empyema. *Chirurgija*, Nov., 1903.

80. **Sassedatelew.** A remarkable anomaly of the ethmoidal labyrinth. *Chirurgija*, vol. xiii., No. 77.

81. **Juergens.** A case of ozæna with fatal termination. *St. Petersburger med. Wochenschr.*, 1904, No. 4.

82. **Laurens.** Surgery of the sphenoid. *Arch. internat. d'otol.*, etc., 1904, p. 81.

83. **Thiele.** On Killian's radical operation for chronic suppuration of the frontal sinus. *Arch. f. Laryngol.*, vol. xiv., No. 3.

84. **Stella.** The radical cure of chronic suppurations of the frontal and ethmoidal sinuses. *La presse oto-laryngologique Belge*, No. 4, 1904.

85. **Fetterolf.** Cardiac inhibition through irritation of the peripheral fibres of the 5th nerve in the course of an operation for chronic empyema of the frontal sinus. *American Medicine*, Mar. 19, 1904.

86. **Toubert.** Some remarks on the method of healing of chronic frontal sinusitis after the radical operation. *Arch. internat. d'otol.*, etc., 1904, p. 398.

87. **Fernandes** and **van Swieten.** Nine cases of chronic frontal suppuration operated upon according to the method of Goris. *La presse oto-laryngologique Belge*, No. 3.

75. According to the author, there are unquestionably cases in which the mucous membrane is diseased without any discharge. After irrigation, the previously existing severe pain ceases. Five cases are reported, two acute and three chronic, in which, notwithstanding existing inflammations of the mucous membrane of the antrum, there was no obstruction for the escape of the secretion into the nose. Notwithstanding, there never was any discharge either in the middle meatus or in the retro-nasal cavity. Tenacious discharge is unquestionably characteristic in these cases, which are no doubt the result of a catarrhal inflammation of the mucous membrane. The entire mass of the discharge coheres, so that it cannot flow out of the nose nor be removed by blowing the nose. Rhinoscopically there is no discharge to be seen in the nose nor in the retro-nasal space. It can only be evacuated by irrigating with considerable force. The discharge is greenish, collected in a large lump, and appears as if surrounded by a skin. On account of these cases, the author demands that in cases of occlusion of the nose where no mechanical cause can be found, or where one continues to exist after treatment, though discharge is not present, the antrum be

examined. This also holds good for the cases in which there is pain in the region of the superior maxillary or the region of the teeth with discharge from the nose or epiphora.

WERNER.

76. This is a statistical report on the diseases of the accessory sinuses from Chiari's clinic, in which the difficulties and importance of the subject are fully considered. The great number of empyemata of the frontal sinuses is unusual. ALBANUS.

77. A series of pictures of the maxillary sinus show that the cavity can best be opened from the alveolus of the second molar tooth. SACHER.

78. Six cases of maxillary cysts. The author favors the theory of Malassez as regards their origin. OPPIKOFER.

79. In two cases, the suppurative process in the lachrymal sac produced a disease of the ethmoid after an involvement of the thin lachrymal bone. SACHER.

80. Posterior to a normally developed frontal sinus there was a second cavity of the same size lined with mucous membrane belonging to the ethmoid, which did not communicate with the frontal sinus, and extended in the roof of the orbit up to the optic foramen. SACHER.

81. The cause of death was a purulent basilar meningitis, which resulted from an extension of an infection from the ethmoid cells. The pus in this case had taken its origin from the purulent collections in the ulcerated mucous membrane.

SACHER.

82. After an anatomical introduction, the various methods of operating the sphenoid cavities are reported. The article brings nothing new. OPPIKOFER.

83. Report of six case-histories of patients operated upon according to Killian's operation. Four of these were successful. In two, a previous operation had been performed and the scars made at that time are now the most noticeable. In one, complete recovery did not take place, and afterwards irrigation of the cavities was undertaken. In one case, death resulted from meningitis. As autopsy was not permitted, it is uncertain whether an old abscess of the frontal lobe or an extradural abscess was present, which was made active by the operation, or an injury of the meninges had taken place at operation, or that the infection had spread by the lymphatics. In no case was there diplopia,

and no affection of the iris on prophylactic use of atropin. In the first two cases, drainage from the inner angle of the wound; later, a drain was introduced from the nose into the frontal region. The formation of a flap from the nasal mucous membrane was at first difficult; in the latter two cases, perfectly satisfactory. It was possible to overlook the large operative field, and the author regards this operation as a distinct advance in the treatment of chronic frontal-sinus diseases. ALBANUS.

84. According to STELLA, the Luc operation is apt to be followed by relapses, especially in chronic suppurations of the frontal sinus with disease of the bony walls, and when complicated with disease of the ethmoidal cells. The author has made use of the procedure described by Jacques and Durand, in No. 8 of the *Annales des maladies de l'oreille*, August, 1903, and reports three cases. A complete exposure of the frontal sinus is possible; disinfection and curetting are facilitated. The ethmoidal cells can be directly treated; there is no deformity and no relapse. BRANDT.

85. During an operation for a chronic empyema of the right frontal sinus in a man thirty-five years of age, reflex cardiac inhibition from the fifth nerve occurred. Every time the curette touched the sinus wall there was a distinct diminution in the force, fulness, and rapidity of the pulse with simultaneous cyanosis. Curetting had, therefore, to be frequently interrupted. This phenomenon has been observed after extractions of teeth, and a similar reflex has been observed at operations in those regions of the ear which are supplied by the trigeminus. TOEPLITZ.

86. An isolated form of frontal sinus suppuration which has existed for only a few months. The Ogston-Luc operation is recommended. If the frontal-sinus empyema is complicated with suppurations in the ethmoidal cells the procedure of Jacques, Killian, or Kuhnt is advised. OPPIKOFER.

87. This is a report of nine cases which have been operated upon according to the procedure of Dr. Goris. The short length of after-treatment is unusual. The patient returned home after eight to ten days and without a bandage. There were no relapses, and the cosmetic result is excellent. BRANDT.

f.—OTHER DISEASES OF THE NOSE.

88. **Veyrassat.** A case of dislocation of the nasal bones. *Revue médic. de la Suisse romande*, 1904, p. 55.

89. **Réthi.** On the treatment of epistaxis. *Wiener med. Wochenschr.*, No. 11, 1904.

90. **Navratil.** A new procedure to correct synechia in the nose. *Arch. f. Laryngol.*, vol. xiv., No. 3.

91. **Mohr.** On the treatment and prevention of hay-fever. *Deutsche med Wochenschr.*, No. 4, 1904.

92. **Lubbert and Prausnitz.** On the serum treatment of hay-fever. *Berlin. klin. Wochenschr.*, 1904, Nos. 11 and 12.

93. **Barth.** A new case of rhino-scleroma in East Prussia. *Arch. f. Laryngol.*, vol. xiv., No. 3.

94. **Strebel.** A new method of treatment for lupus and malignant growths by means of molecular disintegration with continuous high-tension currents. *Deutsche med. Wochenschr.*, No. 2, 1904.

95. **Gellé.** Double syphilitic chancre in the nose and in the conjunctiva. *Arch. internat. d'otol.*, etc., 1904, p. 417.

88. A shoemaker, thirty-three years of age, received a blow on the left side of his nose with a wooden boot. Both nasal bones were dislocated to the right side. The deformity was easily reduced, no dressing applied. OPPIKOFER.

89. After describing the various methods of arresting hemorrhage which are familiar to all, a case of persistent epistaxis is reported in which the hemorrhage could not be arrested. The mucous membrane was curetted with a sharp spoon to an extent of a square *cm*, and trichloracetic acid was applied. The hemorrhage ceased. Similarly two cases were treated with success. Two of the patients suffered from arterio-sclerosis and one from cirrhosis of the liver. WANNER.

90. In a girl of fifteen the author divided the nose, excised the synechia, and transplanted skin grafts which adhered without packing. Recovery after ten days. ALBANUS.

91. MOHR has regularly suffered from hay-fever in the critical period for nine years, and has found that the symptoms of irritation in the beginning are distinctly diminished after the use of Dunbar's antitoxine, the so-called pollantin. He has had made for himself a small protective apparatus which enables him to undergo long journeys without fear of an attack. The apparatus consists of two funnel-shaped structures which are introduced into the nose and fit tight to the nasal orifices. In the funnels there is some thin cotton which forms a safeguard against the entrance of the pollen and can be easily changed. These funnels can be prepared after having taken a wax impression for each side of the nose, though the nasal separator of Schmidt-Hérison can be employed for this purpose. NOLTENIUS.

92. This is the first collective report on the practical experience which was gained during the last hay-fever season with Dunbar's serum. Two hundred and eighty-five patients were treated. Of these, the result was satisfactory in 60 %, partial in 29 %, no result in 11 %. The last number includes all the cases where the result was influenced by improper application or wrong indications. According to the author, only 1.4 % of the cases remain in which a cause for the ill-success was not determined. In any case the report shows that the pollantin in many, and in the most severe cases, exercises a specific action on hay-fever. The degree of this action is not at present fully determined on account of the comparatively few cases. The agent is obtainable in the form of liquid and dry pollantin. The latter appears to be most suited for treatment of the nose. It is especially important that the treatment should be begun before the height of the attack, namely, prophylactically in the morning before rising during the hay-fever period, and then at each onset of the slightest symptoms of irritation. The general rules, of course, should be followed. Exact directions and the necessary instructions are supplied with the agent. At the end of the article the favorable results are reported which have been obtained with the serum treatment of the American autumnal catarrh which is an analogon of our hay-fever. MUELLER.

93. The author observed a farmer, forty-five years of age, in the neighborhood of the so-called scleroma district in East Prussia who had been admitted to the hospital on account of dyspnœa. After a bite by a horse a year ago, a tumor appeared in the right ala of the nose. The tumor was as large as a walnut, hard, and the overlying skin was dark blue. The nose was very narrow. The mucous membrane was brownish, thickened. The nasal entrance and pharyngeal wall were in the same condition. The configuration of the interior of the nose was lost. The epiglottis was thickened, stridulous breathing, subjective dyspnœa. The treatment consisted in a nasal spray and mechanical dilatation of the pharynx with success. ALBANUS.

94. With a large induction apparatus and an especially constructed electrode, which is approached to 1 to *2mm* from the lupus nodule, a continuous current is allowed to play from ten to twenty-five seconds. The affected tissue is so acted upon that on the day after, the nodule has become an ulcer which heals in a few weeks under applications of ointments. This method has

also been tried with success in lupus erythematosus. Attempts to employ this method in the treatment of malignant tumors have not been completed. NOLTENIUS.

95. A young man, twenty-four years of age, noticed a foreign body in his right eye. A companion turned the upper eyelid and removed this particle with the aid of a small piece of cigarette paper which had been moistened with saliva. Two months later a primary lesion occurred on the inner surface of the right eyelid. As respiration through the right half of the nose was interfered with, an examination was made and another primary lesion was found in the mucous membrane of the cartilaginous septum, which was probably transmitted by the finger of the patient or through the tears. OPPIKOFER.

g.—NASO-PHARYNX.

96. **Zuckerkandl.** On cartilage in the pharyngeal tonsil. *A. f. O.*, 1904, No. 2.

97. **Potapow.** The third tonsil in nurslings. *Russky Wratsch*, 1903, No. 49.

98. **Okunew.** On removing adenoid tissue from the epipharynx, especially in ear diseases. *Wojenno-Medicinski Shurnal*, 1896, vol. clxxxvi., pp. 740–789.

99. **Reinhard.** On the presence of foreign bodies in the nose with adenoid vegetations. *A. f. O.*, vol. lx., p. 35.

100. **Burger.** Fatal hemorrhage after removal of adenoids. *La presse oto-laryngologique Belge*, 1904, No. 4.

101. **Guye.** Adenoid vegetations of the naso-pharynx. *Arch. internat. d'otol.*, etc., 1904, p. 186.

102. **Zwillinger.** On the relation of the hyperplastic pharyngeal tonsil to stuttering. *Wiener med. Wochenschr.*, No. 6, 1904.

103. **Grossard.** Stuttering and adenoid vegetations. *Arch. internat. d'otol.*, etc., 1904, p. 403.

96. Following Reitmann's article on the occurrence of cartilage in the pharyngeal tonsil, the author describes the microscopic examination of the pharyngeal tonsil in a lion, in which a great number of cartilaginous fragments of varying size were found present. Moreover, the tonsil tissue consisted of a connective-tissue plate, a superficial adenoid layer, and an intervening granular layer. PIFFL.

97. The author claims that this affection occurs frequently in children, and recommends the early removal of the pharyngeal tonsil with the Gottstein curette under local anæsthesia, but never before the fourth month. Before operation the naso-pharynx should be cleansed by the frequent pouring into the nose of a solution of salt and soda. SACHER.

98. The author recommends removing adenoid vegetations in various sittings with a cutting forceps. In many cases an immediate improvement of the hearing took place. In other cases where the vegetations were situated in the roof of the pharynx and about the tubal openings, the hearing was distinctly diminished after operation. SACHER.

99. This simultaneous condition occurs frequently in children, and the foreign body in the nose is apparently of diagnostic importance for adenoids. HAENEL.

100. BURGER lost a patient, aged eleven, from hemorrhage after removing adenoids. The child suffered from leukæmia. This disease is not mentioned in the literature as a cause for death on operation. The author since this unfortunate experience examines each child for symptoms of leukæmia. One child, which was recognized as suffering from leukæmia, was not operated upon and died five weeks later.

Severe hemorrhages after removal of adenoids are unusual. In the literature, the author was able to find reports of only 4. Of 78 hemorrhages, 14 were in patients more than fifteen years old; so that the danger of hemorrhage increases with age, which is probably due to the more resistant tissues. The time of onset of the hemorrhage varies. At operation, it occurred in 3 cases, two hours after operation in 19, six hours after in 3, twenty-four hours after in 4; 1 case bled on the second day, 5 on the fifth, 1 on the eighth, and 1 on the ninth. The instrument employed is apparently of little importance.

The causes for severe hemorrhage given in literature are, inflammations, menstruation, restlessness after operation, and traumatism. Burger regards the particles of adenoid tissue which remain as the most important sources for the hemorrhage. BRANDT.

101. This paper was read at the Congress for Hygiene, in Brussels. GUYE pleads for an examination of the children in all of the schools in every land for the presence of adenoid vegetations. OPPIKOFER.

102. In 28 % of the cases, adenoid vegetations were present. The author concludes:

(1) An association between adenoid vegetations and stuttering in the sense of cause and effect does not exist.

(2) Adenoid vegetations furnish a predisposing factor in the production of stuttering.

(3) After removal of adenoid vegetations, in rare cases the stuttering can be cured.

(4) Removal of adenoid vegetations is not neglected in every case of stuttering, otherwise the treatment would be of no avail.

WANNER.

103. Three cases of stuttering were immediately and completely cured on removal of the pharyngeal tonsil.

OPPIKOFER.

h.—PHARYNX AND MOUTH.

104. **Blumenfeld.** On the etiology and treatment of xerosis of the mucous membranes of the throat. *Arch. f. Laryngol.*, vol. xiv., No. 3.

105. **Conrad.** On the present state of our knowledge of Vincent's angina. *Arch. f. Laryngol.*, vol. xiv., No. 3.

106. **Hertz.** A case of acute pharyngeal tuberculosis in a child six years of age. *Arch. f. Laryngol.*, vol. xiv., No. 3.

107. **Sokolowsky.** On the relation of granular pharyngitis to tuberculosis. *Arch. f. Laryngol.*, vol. xiv., No. 3.

108. **Trétop.** The rôle of the tonsils in infections. *La presse oto-laryngologique Belge*, 1904, No. 4.

109. **Heuking.** On severe hemorrhage after operation for hypertrophied tonsil. *St. Petersburg med. Wochenschr.*, No. 11, 1904.

110. **Chaureau.** Congenital perforation of the anterior pillars of the fauces. *Arch. internat. d'otol.*, etc., 1904, p. 556.

111. **Sserapin.** On mixed tumors of the palate. *Russéj Chirurgitscheskij Archiv*, 1903, No. 2.

104. The author describes the etiology and emphasizes the difference in climate between the cities on the Atlantic coast and on the other side of the ocean, and its importance for the upper respiratory passages. As to the importance of diabetes as a cause for xerosis, three cases are reported, which were observed in one year, where diabetes was diagnosticated from the condition in the throat. Hypertrophic forms of pharyngitis occur, according to the author, more frequently in gout, atrophic forms in chronic arthritic deformans. A case is then reported, which corresponds to the one described by Sticker as a metasyphilitic xerosis in the respiratory organs. Treatment: Sea climate; in the winter, islands of the Mediterranean. Local: iodipin, at the same time gargles and inhalations of salt springs. Twenty cases were treated with success by this method, with the exception of only four.

ALBANUS.

105. The author does not commit himself to the theory that the virulence of the bacillus has been increased by symbiosis

with the spirillum, because he found in one case of a relatively mild membranous form both bacilli and spirilla in equal numbers. In another case of severe ulcerous form, chiefly bacilli were found present. The etiology, differential diagnosis, and treatment are described. Three cases are related, with illustrations of their microscopic conditions. In one case, at the acme of the disease, a pure culture was found. Later, the bacilli and spirilla gradually diminished and the various bacteria found in the mouth appeared. ALBANUS.

106. In the beginning, pain in the neck, dysphagia, fever. Diphtheria was diagnosed. Serum was injected with no improvement. Dysphagia, then cough, expectoration, and emaciation. Examination revealed many small ulcers on the uvula, soft palate, palatal arches, and posterior pharyngeal wall, which had taken the form of a large ulceration on the posterior pharyngeal wall. The uvula and the anterior palatal arches were swollen and covered with miliary tubercles. The epiglottis was swollen. Over the larynx, an increased respiratory murmur with crepitant râles could be heard. T. 38.2° C. Tuberculous bacilli were found in the discharge from the pharyngeal ulcers. Death after three months. ALBANUS.

107. In thirty-four cases, granula of the pharynx and parts of the lateral folds were removed for microscopic examination. In eight of thirteen, with other signs of tuberculosis or lupus, the microscopic sections showed tuberculosis of the granula or of the lateral folds. In one case, the finding of tuberculosis in a granulum of the pharynx led to an examination which revealed incipient trouble at the apex of the lung. The form of tuberculous involvement of the granula or lateral folds corresponds to the latent form of tonsillar tuberculosis. The granula and lateral folds should be extirpated in some cases for diagnosis, in others as a prophylactic and therapeutic measure. ALBANUS.

108. A child, fourteen years of age, belonging from constitution and family antecedents to the pre-tuberculous, was taken ill with a mild tonsillitis. After this, the cervical glands enlarged and broke down. The entire package of glands was extirpated and proved to be tuberculous. The tonsils consequently play a great rôle in infections. In their crypts all kinds of malignant bacteria are to be found ; nephritis, colitis, etc., may follow febrile inflammations of the tonsils. It is very important that the mouth and the pharynx be properly cared for

during the various inflammations of this region. In individuals predisposed to recurring attacks of tonsillitis, the tonsils should be removed. BRANDT.

109. In five cases the author observed severe hemorrhage after removal of hypertrophic tonsils. One peculiarity, which occurred in all cases, consisted in the fact that the hemorrhage came from the posterior palatal arch, which had been incised during the removal of the tonsil. This source of hemorrhage has not been regarded in books on surgery or on diseases of the throat. The tonsillotome seems to be more apt to cause an injury than the knife or the scissors. The very much feared injury to the internal carotid, according to the author, is practically impossible, if the operation be performed with moderate care. It must be acknowledged that hemorrhage may occur in a properly executed tonsillotomy from injury to the internal maxillary and lingual arteries when these vessels travel an anomalous course, though the literature does not describe any such accident. In a few cases, injury of the tonsillar artery has been followed by obstinate hemorrhages. The best and simplest method in a severe hemorrhage consists in pressing the bleeding area with the index finger introduced into the mouth of the patient. In severe hemorrhage, the carotid artery must be ligated. SACHER.

110. CHAUREAU observed accidentally in a patient, aged thirty, with nasal polypi, a congenital defect in both anterior pillars of the palate. One perforation was like a fissure and the other oval. OPPIKOFER.

111. A patient, female, thirty-eight years of age, has suffered for four years from a slightly movable tumor, as large as a hen's egg, attached to the hard palate. It was easily enucleated. Microscopic examination showed that the tumor belonged to the teratomata. SACHER.

BOOK REVIEWS.

I.—**The Modern Mastoid Operation,** by F. WHITING, A.M., M.D., Professor of Otology, Cornell University Medical School, Aural Surgeon to the New York Eye and Ear Infirmary, etc. 353 pages, in quarto, illustrated with 25 half-tone plates. P. Blakiston's Sons & Co., Philadelphia, 1905. Price $6.

This stately monograph is an exhaustive treatise on the operation for acute suppurative mastoiditis which the author recommends. After an historical introduction, the main part of the book is given up to the "complete modern mastoid operation." Every step from the preliminary preparation to the after-treatment is taken up in a chapter for itself. The descriptive text is illustrated by twenty-five admirable half-tone reproductions accompanied by key plates. The illustrations are both true to nature and artistic.

The chief points in Dr. Whiting's conception of the mastoid operation, beyond a complete ablation of the mastoid process, consists in adding a horizontal incision to the usual vertical cutaneous incision, and the systematic removal of the cells situated in the superior meatal wall (posterior root of the zygoma). Preceding the technical part, a chapter is devoted to the pathology of suppurative mastoiditis, and in conclusion the indications for the mastoid operation, with differential diagnosis, are added. This book, by an author who has been so active in the development or rather completion of the operation for acute mastoid disease, will be read and studied with interest and profit by all active aural surgeons, while for those of less experience the presentation of the anatomy, operative surgery, and pathology in a single volume will be of great value and convenience. A. K.

II.—**Die Operative Ausraümung des Bulbus Venae Jugularis** (The Operative Eradication of the Bulb of the Jugular Vein), by Prof. K. GRUNERT, of Halle a. S. Pp. 145. F. C. W. Vogel, Leipzig, 1904. Price 4 Marks ($1).

Advance in the operative treatment of pyæmia of otitic origin has in recent years been directed to rendering the jugular bulb directly accessible to operation. This has been found necessary where the pyæmic manifestations have continued from a jugular-

bulb thrombosis, notwithstanding resection of the sigmoid sinus and ligation of the internal jugular vein. Methods of completely exposing the bulb of the jugular vein with cases have been previously described by Grunert, Stenger, Hinsberg, and Piffl.

Grunert in this monograph gives the histories of twelve personally observed cases from the Schwartze clinic and five of other authors where the jugular bulb was exposed and opened. Chapters on the anatomy of the jugular bulb, pathology of jugular-bulb thrombosis, diagnosis, and treatment follow. The operation is indicated when with continuation of severe pyæmic symptoms the disintegrated thrombus of the jugular bulb cannot be satisfactorily treated by manipulation from the sinus above, or the vein below, or by irrigation, and in certain forms of primary bulb thrombosis.

The operative purpose is to convert the sinus, bulb, and jugular vein into a continuous groove with a common external opening. The steps of the operation are as follows: After complete resection of the mastoid process and ligation of the internal jugular vein, the soft parts are strongly retracted from the base of the skull in the direction of the jugular foramen, the transverse process of the atlas, if unusually prominent, is resected, the insertion of the deep muscles detached, and finally the bony bridge (jugular process of the occipital bone) forming the boundary of the jugular foramen is broken through with the chisel and hammer without necessarily injuring the facial nerve. The bulb then lies exposed, its external wall can be excised, the thrombus masses removed, and the venous communications directly examined.

The author claims that this operation can always be performed, though with greater or less difficulty, according to the anatomical conditions, except perhaps in the presence of an unusually developed paracondyloid process which articulates with the transverse process of the first cervical vertebra. Direct injury to the facial nerve can be avoided; a temporary paralysis may result from traction of the soft parts. In only one out of twelve cases was a temporary paralysis observed.

As to the therapeutic value of this operation nothing more can be said at present, in view of the difficulty of answering this question and the small number of published cases, than that further absorption of infectious material from this focus was arrested. From these brief excerpts it will be seen that Grunert's excellent monograph is most instructive and stimulating.

A. K.

Obituary.

Professor A. A. G. Guye.

News of the death of this well-known Netherlands aurist, which took place on January 15, 1905, will be received with great regret by his colleagues. He belonged to the old otological guard, and aided in the development of modern rhinology and otology for a period of forty years.

Guye was born on August 17, 1839, in Maastricht. He studied medicine in Amsterdam, and graduated in Leyden in 1862. He then studied under Troeltsch and Politzer, then in Berlin and Paris, and on his return to Amsterdam gradually devoted himself exclusively to his specialty. In 1886, he was appointed Extraordinary Professor of Otology, the first occupant of the chair. His inaugural address was on the importance of Otology in medical science.

In a short time his fame as an aurist became very great, and for many years he was the first otologist in his country. He was appointed for nine successive years President of the Netherlands Society for Diseases of the Ear, Nose, and Throat, which he and Zwaardemaker founded in 1893.

His publications began in the year 1865, and have appeared in four different languages, and on almost every division of Rhinology and Otology. Though he did not devote very much of his time to laboratory work or experimental investigations, his time was chiefly occupied in his consulting-rooms, especially in his policlinic, in which he was generally occupied from three to five hours daily without interruption.

He possessed unusual scientific intuition, and was early impressed with the importance of normal nasal respiration. He constructed the first contra-respirator. He was one of the first to attack adenoid vegetations, and described a ring knife, which was introduced through the mouth. In this combat he was tireless. The governmental investigation of the frequency of adenoid vegetations in school children was started at his instigation.

The best-known papers of Guye are those on Nasal Aprosexia. Though others had recognized before him the disturb-

ances of mental functions consecutive to nasal disease, he was surely the first to recognize the importance of these disturbances and to have offered a satisfactory hypothesis. The pathology of the static organ was always of great interest to him. He was one of the first to connect the form of subjective sensation of rotation in Ménière's disease with the planes of the semicircular canals. He also succeeded in showing that in most cases aural vertigo depended upon disease of the middle ear and not on a primary labyrinth affection.

Though the name of Guye will remain prominent in the annals of Rhinology and Otology, the death of this many-sided man will be felt as a personal loss by many. He was a true international figure, and was able to speak and write German, French, and English with equal facility with his mother tongue. He assisted in the foundation of the German Otological Society, as well as the French and the Paris Oto-Laryngological Assemblies.

He also devoted a great deal of time to improving the condition of physicians in his country. He served as Secretary of the General Netherlands Society of Physicians for fifteen years, and during five years edited the largest Netherlands medical weekly. In 1879, he was General Secretary of the Sixth International Medical Congress, and in 1888 he was presiding officer of the meeting of the Netherlands Scientists and Physicians.

H. BURGER.

Professor Louis Jacobson.

Professor Jacobson died in Berlin on January 26th of this year. He was born in 1852, in Königsberg, the son of a Professor of Medical Physics. He studied in Königsberg and in Berlin, and received his training in Otology under Politzer, in Vienna. In 1877, he became an assistant in the Berlin Ear Clinic, under Professor Lucae, and in 1897 he received the title of Professor. His most important work is his text-book on Otology. He was well versed in physics, and was most interested in the study of acoustics and in experiments which were characterized by unusual care and judgment. His memory will be preserved by the importance of his scientific papers. He was the second presiding officer of the Berlin Otological Society. Many patients and friends will remember him as an excellent man and a charming physician.

BRUEHL.